COMPUTERWORL

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Uncle Sam's bookkeeping bashed: Auditors say Treasury Department systems have not been able to verify multibillion-dollar accounts. Page 132.

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Will Cray Research build or buy the new architecture that company officials concede is needed by the end of the decade? Page 25.

Tally ho: Can a \$7.50-perunit software package be cause for success? Tally Systems Corp. sees quick growth with PC inventory management software. Page 101.

Covia chief flies off to CIO seat at Northwest Airlines. Page 6.

Compaq to use speedier 386SX in addition to SLT laptop line. Page 8.

Olsen upbeat, but profits sag

BY MARYFRAN JOHNSON

MAYNARD, Mass. - Digital Equipment Corp. President Kenneth H. Olsen last week sketched a future bright with technology advances for DEC users, but he dulled the hopes of the investment community by confirming that the VAX 9000 mainframe will not ship in volume until later this summer.

In an interview with Combuterworld, Olsen said reduced instruction set computing technology - now being built into some features of the VAX 9000 - will expand throughout future VAX computer lines.

He also said Ultrix, DEC's version of AT&T's Unix System V operating system, will eventually blend with the Open Software Foundation's Unix version,



DEC President Olsen high on technology, low on Wall Street

which is slated to be introduced

Analysts said DEC's internal development of the so-called E - a RISC-based machine that will run the proprietary VMS operating system — is expected to produce the new breed of VAX systems by the middle of 500, a new top-end model for the powerful midrange line, makes its debut in late summer or early fall, it is also expected to contain RISC elements meant to boost its processing speed.

However, Olsen had little welcome news for stock watchers, who were hoping that the VAX 9000 would give DEC a much-needed earnings boost this quarter. "We never promised real deliveries until next quarter," he said. "On the inside, we hoped we would get out more, but we never counted on

Adding another damper to financial expectations last week was James Osterhoff, DEC's vice-president of finance. He told a group of investment professionals in New York that a

Continued on page 133

Don't yank those wires out just yet

BY JOANIE M. WEXLER

Companies ogling the highspeed capability of fiber-optic cable may soon be able to use their existing copper wiring to get those speeds at lower prices.

Synoptics Communications, Inc. and Chipcom Corp. said in separate announcements last week that they have developed technologies for running 100M bit/sec. data traffic over twistedpair wiring as a lower cost alternative to the fiber medium specified in the standard for Fiber Distributed Data Interface localarea networks.

Both said they intend to present their competing technologies at this week's American National Standards Institute FDDI committee meeting with the goal of creating a standard for running the high data rates over twisted-pair and accelerating FDDI to the desktop.

While the two announcements "push the edge of technology and offer users interesting Continued on page 6

D&B Software ready to face skeptical M&D user crowd

BY MAURA J. HARRINGTON

On the eve of their annual user group conference, many McCormack & Dodge customers are voicing concerns about the future of the M&D product line and the level of support they will receive from Dun & Bradstreet Software now that former Management Science America, Inc. Chairman John Imlay has taken

D&B Software will attempt to allay those fears at this week's conference in San Francisco by introducing an on-line bulletin board service as well as additional support services for M&D customers, the company said.

"We have made all of the organizational changes and personnel changes," said Jim Henderson, executive vice-president at D&B Software, at a recent in-dustry conference. "Also, we have been very careful to try and

Customers of the former M&D unit are taking a "show-me" stance, however. "That all sounds like a bunch of mother-hood and apple pie to me," said Roger Hesslau, applications systems manager at Walgreen Co., shield (the effects of) this merger from our customers, so I sincerebased in Deerfield, Ill. ly hope you haven't seen any im-

Hesslau said he was concerned that D&B Software was Continued on page 4

REBEL WITH A CAUSE

Next finds revolution a Long March

BY AMIEL KORNEL and JAMES DALY CW STAFF

pact on your company because of

Maybe it's the visionary thing. Or maybe it's just more California hype. But every time Steve Jobs develops a new computer, he and his backers predict that it's going to rock the world.

While Jobs' first brainchild, Apple Computer, Inc., did indeed launch a new era in computing, skeptics are wondering whether the same magic has rubbed off on his newest ven-

Jobs unveiled the sleek black Next, Inc. computer in October 1988, saying it boasted enough technological innovations to of corporate computing.

Reviewers raved. Steve came out with it in '88, I

done before on Unix," said James Bruce, vice-provost for information systems at MIT and a member of Next's Educational Advisory Board. "It was revolutionary.

the Next workstation has come to seem less radical. In the fastchanging world of high-tech, Jobs may have lost his edge. Continued on page 130



saw something I hadn't seen The man and his machine: Steve Jobs and the Next system

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Quotable

"E veryone agrees that if it had been able to come out a year earlier, it would have seemed more spectacular."

> RICHARD CYERT CARNEGIE MELLON UNIVERSITY

On the Next machine. See story page 1.

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PRODUCT SPOTLIGHT

81 While some break speed records on 486-based PCs, others wait for an appropriate operating system to appear.

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99 Credibility can make or break an IS career. By William Harris and Susan Behnke.

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our spouse thinks it's all fun and games, but business travel is what business people most love to hate. A sampler of "hates" from a recent survey of 650 frequent-flyer members of the American Productivity & Quality Center includes these quips: "Flights canceled for unbelievable reasons, like not enough sleep for crew, no pilot, other apparent lies." "Ants in my bed. No apologies from hotel. Sent a guy who looked like he was out of a horror movie to move me late at night." "Plane had a power failure that lasted several seconds. Screaming, yelling, food all over. Told us it was wind shear. Bull. It was a flameout, pure and simple.'





Security Pacific Bank's Richard Harmel turned to a relational database and windowed workstations in cleaning up a systems mishmash. Page 29.

EXECUTIVE BRIEFING

- The annual McCormack & Dodge users group conference opens today in San Francisco amid widespread skepticism about product support under the MSA-dominated management of D&B Software. D&B Software will try to allay those fears by announcing 24-hour hot-line support and an on-line bulletin board help desk. Page 1.
- Movement in the IS executive ranks continues as Barry Kotar, president of United Airlines' computerized reservation system subsidiary Covia, hopped on board with competitor Northwest Airlines. Kotar fills the spot left vacant when William Sitter became Allstate's CIO last year. Separately, former Chrysler MIS Director G. Nichols Simonds became the new IS chief at Honeywell, and Dale Riordan was named to the top IS post at Fannie Mae. Stories, pages 6, 132.
- IS executive pay is 9.4% higher than last year, according to a survey of 31 large corporations. However, top positions in systems planning, disaster recovery and database administration zoomed 25% or more. Page 8.
- A Harris poll found that 79% of Americans are concerned about threats to their privacy in the computer age. A shocking 45% agreed with the statement that "technology has almost gotten out of control." Page 4.
- DEC customers will see a wide range of technology advances in the next few years, DEC President Ken Olsen said in a Computerworld interview. RISC architecture will become more prevalent throughout the VAX product line, and Ultrix will eventually blend with the Open Software Foundation's Unix version. However, the VAX 9000 will not ship in volume until late this summer, dimming Wall Street's hopes of a DEC financial rebound. Page 1.
- Oil giant Sun R&M Co. decentralized its IS department last year with the intention of getting systems decisions closer to the business units. However, the move has reaped the added benefit of promoting IS managers to "first-class citizens" who participate in business unit budget and personnel decisions. Page 71.
- A comprehensive study of the true costs and benefits of electronic data interchange has been been launched by an auto industry IS group and Carnegie Mellon. Research-

- ers will study the use of EDI at Chrysler, LTV, Texas Instruments and Southwestern Bell. Page 6.
- The Next machine has not set the world on fire, despite the hype and hope of Next founder Steve Jobs. Next's lackluster sales prove once again that whiz-bang, ahead-of-its-time technology can be a tough sell in the marketplace. Stories, pages 1, 130 and 131.
- Equipment arbitrage is legal, and a manager at John Hancock's IS group says it offers a leading-edge technological strategy without financial bleeding. It means buying products at deep discounts any way possible and selling them into the used-equipment market just before prices soften. Page 122.
- On-site this week: Security Pacific's global trading centers on four continents rely on the client/server model, with DEC's RDB relational database as the anchor. Page 29. Managing 500 local-area networks across the country isn't easy. Martin Marietta employs fast-packet multi-plexer technology to do the job while cutting down on T1 lines. Page 59. Veteran's Affairs Medical Center in Palo Alto, Calif., has brought in vorkstations from Silicon Valley neighbor Sun Microsystems to track and interpret patients' diagnostic data. Page 45. The vacations that dreams are made of will depend on IBM Systems Network Architecture peer-to-peer connections at Miami's Cruiseship Information Systems, an electronic cruise booking service. Page 60.

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Consumers fear threat to privacy

BY MITCH BETTS

WASHINGTON, D.C. - Because of a gut-level distrust of government, business and "uncontrolled technology," nearly four out of five U.S. consumers (79%) are concerned about threats to their privacy in the computer age, according to a Louis Harris and Associates, Inc. opinion poll released last week.

Humphrey Taylor, president of the New York-based polling firm, said the national survey of 2,254 consumers "sends a strong warning signal" to companies that have databases of consumer information. Businesses that fail to respond to consumer concerns about privacy may wind up facing strict government regulation, he said.

Alan F. Westin, a Columbia University professor and academic adviser for the poll, attributed the results to the public's general distrust of large institutions and technology. The poll found that 45% of Americans agreed with the statement that "technology has almost gotten out of control."

The survey comes at a time when many consumer advocates are upset about the trend toward "database marketing," in which direct-marketing firms compile lifestyle databases and credit

profiles for highly targeted marketing campaigns [CW, May 14].

The poll found high levels of trust that hospitals, government agencies and employers will handle personal data in a responsible manner, but consumers put direct-marketing and credit-reporting firms at the bottom of ness" as a fundamental right, the survey found.

The poll results may provide a boost for several legislative proposals - such as a bill creating a federal privacy oversight board and another one regulating Caller ID services - now getting attention in Congress, according

Who can be trusted with private data? Direct marketing and credit-reporting firms rank lower than the IRS when it comes to trusting them with personal information

Hospitals	1000	81%
U.S. Bureau of the Census	-	81%
Employers		77%
Social Security Administration		70%
Telephone companies	100	76%
Internal Revenue Service	67%	
Companies that investigate job applicants	65%	
Credit bureaus 59	%]	
Direct marketing firms 34%		

arce: Louis Harris and Associates, Inc

CW Chart: Doreen Dahl

the list (see chart).

Seven out of 10 U.S. consumers (71%) feel they have lost all control over how personal information about them is circulated and used by business, while 79% believe privacy ranks with "life, liberty and the pursuit of happito Marc Rotenberg, spokesman for Computer Professionals for Social Responsibility.

Westin said the most progressive firms have adopted a code of 'fair information practices" and formed consumer advisory boards to help management re-

spond to privacy concerns. "The winners in industry will be those that listen and respond," said Bonnie Guiton, consumer adviser to President Rush.

Despite the strong concern about privacy, Westin said, U.S. consumers are also pragmatic. He said they are willing to divulge personal information if they believe it will be handled fairly and they will get some 'hargain' in return.

The poll found that 78% of the consumers admitted they would be upset if they could not obtain credit based upon their record of paying bills portunity made possible by credit databases. "Consumers want it all. They want privacy, and they want the consumer society," Westin said.

ety," Westin said.

The poll was commissioned by Atlanta-based Equifax, Inc., a provider of consumer financial data and a major player in the credit bureau industry. Taylor praised Equifax for its "gutsy decisions" to sponsor a poll likely to produce adverse publicity and to give Harris full control over the poll's content.

C. B. "Jack" Rogers Jr., president and chief executive officer of Equifax, explained that the company wants to take the "high road" on the privacy issue and is planning to capitalize on it this fall by introducing an unspecified service "designed to give consumers a more active role in direct marketing."

D&B

heavily MSA-dominated and that M&D support could fall by the wayside because the company has limited resources.

Other M&D customers said that they have already begun to notice a decline in the quality of support during recent months.

You get the feeling that the company is thinking of their bottom line first, with plans of filling in the gaps later," said Patricia David, an M&D user at Merrill Lynch & Co. in New York. "The quality of support just isn't there right now.

"If [D&B Software] does not increase their customer support and service enough to accommodate the combined customer base, then the merger will be a failure in my eyes," said Michael Coxhead, assistant vice-president of MIS at Chicago-based JMB Properties and national cochairman for M&D's Tools user

However, according to Julie Donahue, vice-president of worldwide product support, customers will be more than satisfied with D&B Software's plans to beef up product support.

Donahue said that users are in for a big surprise when the company unveils its support strategy at this week's meeting.

Insight, the bulletin board Help system that will be on display at the conference, is due to be available within 30 days, Don-

"The most significant announcement we will be making is that we will be offering our customers a new service that will give them 24-hour support for production-down situations. Donahue said, explaining that a 24-hour hot line will be set up with consultants on call for emergency situations.

While D&B Software plans to focus immediately on users' concerns with support, the company will not be releasing information about future product line directions until late August or September, Imlay said in a recent phone interview.

"As far as what will happen with the product lines, I don't think we know yet. I don't think [D&B Software] knows yet. I think we'll just have to wait and see at this point," said Bonita Paynter, an M&D user and director of financial systems at Kraft, Inc. in Glenview, Ill.

As for the company's stability throughout the merger, Imlay said, sales are up by 25% this quarter, based on combined sales for the same quarter last

Bill McNee, an analyst at Gartner Group, Inc.'s Software Management Strategies service, said sales were up because of customers who had a "wait and see" attitude and have come off the fence this quarter to fulfill their back product demands.

However, he added that sales will probably stagnate after this quarter for a while until the company's next-generation product line comes out.

Indignity rankles

D&B Software has said that organizational changes are behind the newly merged firm, but bitterness lives on in the M&D employees who lost their jobs.

Although the D&B Software severance program, called the Merger Action Plan, was officially completed on May 31, many former M&D employees are still upset about the severance

"They could have done this with much more dignity. Instead, they came into a department, called a meeting on a Thursday morning, and those who made it through the day ould know they had their job for one more week," a former M&D employee said.

Another employee, who still works at the firm, said the Natick, Mass., office was virtually unaware that there were layoffs at Management Science America in Atlanta - the firm M&D merged with — until someone called a Natick employee after being laid off. "It would have helped if we had known what was going on, rather than being treated like numbers," the employee said.

Severance packages were given to approximately 325 people worldwide, reducing the work force by about 10%, according to Ken Millen, director of human resources at D&B Software. "About 100 people were severed in Atlanta and 125 in Natick, as well as another 100 people worldwide," he said. The severance program cost D&B Software about \$10 million, Millen said.

"I think, in most cases, there are people in the company that are bitter, but when I look at what we've done in our area, inside and outside of our industry, I think we've done a good job," Millen said.

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Istant News Edit James Connolly Senior Editors on Wilder, Manag

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Sonior Editors
chael L. Sullivan-Tra
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Lory Zottola Sonior Write David A. Ludi Associate Edi Laura O'Conn Jodie Nase Kim Nash

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Margaret McIndoe Washington, D.C.
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Midwest 708/827-4433 lis Booker, Corresponden ael Fitzgerald, Correspon Ellis Br

IDG News Service Penny Winn, Director Mein Editorial Office ox 9171, 375 Cochituate Road ramingham, MA 01701-9171 508/879-0700 Fax: 508/875-8931

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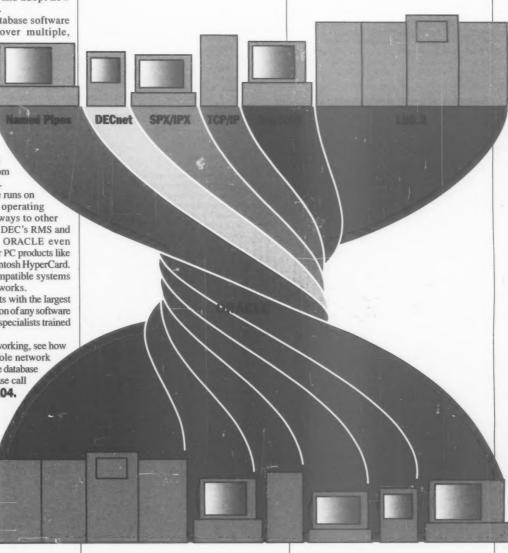
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NEWS SHORTS

Administration: Audit credit records

In response to consumer complaints about inaccuracies in credit bureau databases, Bonnie Guiton, consumer adviser to President Bush, last week suggested the government audit a sampling of credit files for accuracy and publish the results annually. She told Congress that this approach — similar to the federal report card on airlines' on-time arrivals — would be an incentive for credit bureaus to improve their records for accuracy.

Fannie Mae names IS chief

The Federal National Mortgage Association last week named Dale P. Riordan as executive vice-president for operations and systems, with a mandate to fully integrate Fannie Mae's "business side with the company's information technology capacities." Riordan was previously head of marketing and has rotated through several other senior positions at the mortgage investment firm. He succeeds Samuel A. Alward, who will become technical adviser to the company president. The company said it converted records for six million loans from manual to computer systems under Alward's leadership.

Reach way out and touch someone

In an unprecedented acquisition, two regional Bell holding companies pooled their cash last week to purchase a foreign telephone company. Ameritech and Bell Atlantic Corp., along with two New Zealand investors, said they would purchase the state-owned Telecom Corp. in New Zealand for approximately \$2.4 billion. At the conclusion of the deal, Ameritech and Bell Atlantic will hold 24.95% of the New Zealand telephone company, which has 3.3 million subscribers.

E-mail directory debuts

3Com Corp. last week announced 3+Open Directory, which it claimed is the first multivendor global naming directory for LAN Manager systems. Based on the still-incomplete CCITT X.500 electronic mail directory standard, the directory is said to provide users with a single repository for network names and addresses and to synchronize directory updates across the network. 3Com also announced 3+Open Menus, which will allow users to access applications or information across networks not only from 3Com but also from Novell, Inc. and Banyan Systems, Inc. Both products are scheduled for delivery in the fall.

Sun signs up Mentor

A week after electronic design automation firm Mentor Graphics Corp. renewed its contract with Hewlett-Packard Co. for reselling its Apollo Division workstations, the firm inked a similar agreement with Sun Microsystems, Inc. Mentor's software, which had been installed only on the Apollo platform since 1981, will be on Sun-based products by the end of the year.

Stratus backs OSF standard

Stratus Computer, Inc. last week announced that it will support the Open Software Foundation's Distributed Computing Environment (DCE) software on both the proprietary VOS and FTX, Stratus' version of AT&T Unix System V. DCE is a proposed industry standard software technology for distributed applications shared by multiple vendors' networked computers. It is endorsed by IBM, Digital Equipment Corp., HP, Microsoft Corp. and other prominent vendors.

IBM strikes Kodak deal

IBM tapped into the publishing world last week through a joint venture with Eastman Kodak Co., owner of the Atex Publishing Systems unit. The two companies said that they plan to mount a standards-based publishing systems architecture to be used by magazines and newspapers throughout the world. IBM denied reports that it was taking an equity stake in Atex.

More news shorts on page 132

Northwest lands Covia CEO

BY ELLIS BOOKER

MINNEAPOLIS — Barry A. Kotar booked himself a one-way flight here last week, leaving his post as president and chief executive officer at Covia Corp. to join Northwest Airlines as its executive vice-president and chief information officer.

Kotar's arrival at Northwest completes the loop-de-loop that started last year at Northwest — the nation's fourth largest carrier — when then-top information systems executive William H. Sitter left the firm to join Allstate Insurance Co. as CIO and senior vice-president of information technology [CW, Oct. 21.

"Barry is the premier automation expert in the airline industry, and he is an important part of the executive team we have assembled over the last several months," said Northwest Chairman Al Checchi in a prepared statement.

Kotar will oversee Northwest's entire computer and communications operation, including

its executive information service, telecommunications and systems development for computer applications in all of the airline's departments and divisions.

Kotar came to Rosemont, Ill.based Covia in 1987 from United Airlines, which spun off its Apollo

tic and foreign airlines

computerized reservation system operation as Covia in 1987. Today, Covia is jointly owned by United and a group of domes-

spun off its Apollo computerized reservation sys-

NorthNorthncluding

Northncluding

Northsident of Apollo service and vicepresident of Customer services.
In another recent IS change at
Northwest, Doug-

During his 20-year tenure at

In another recent IS change at Northwest, Douglas J. Schwinn, senior director of information systems development, left the company late last month to join Hayward, Calif.-based department store chain Mervyn's as its director of systems and programming.

Covia Vice-President of Business Development Paul Blackney had been named acting president and CEO, according to a Covia spokesman.



Kotar lands at Northwest as V.P. and CIO

Wires

FROM PAGE 1

choices," users expressed some concern about error rates and distance limitations between nodes — particularly using unshielded wiring, said Alice J. Bradie, a principal at Hambrecht & Quist, Inc. in New York.

"I see where this would be beneficial, but I seriously question the quality of the [unshielded twisted-pair] wires in older buildings for running 100M bit/ sec.," said Bill Riess, a senior engineer at Commonwealth Edison in Chicago.

Dave Fowler, vice-president of marketing at Chipcom, acknowledged that there is "no guarantee that all existing wire will run at 100M bit/sec.," but noted that users with data-grade wiring installed within the last four to five years would be prime candidates for the technology.

The vendors said that the full benefits of FDDI could be realized using the alternative medium, but the proposed technologies accommodate nodes attached to just one of the dual counter-rotating rings specified in the standard topology of an FDDI LAN. Also, the distance limitations between nodes would be reduced from 2km to about 100m for shielded twisted pair and 50m for unshielded twisted pair - rendering the technologies less applicable to backbone configurations.

Many users, though, are more interested in high-speed backbone configurations to link their independent LANs than in direct connections. Jim Bloomquist, vice-president of statistical computing at A. C. Nielsen Co. in Northbrook, Ill., said, "We're now looking at 10Base-T

[10M bit/sec. Ethernet over unshielded twisted pair] as a backbone. If suddenly we could do FDDI over copper, it might be cost-effective to move to FDDI more quickly."

Added Bradie, "If you could run your 16M bit/sec. token-ring at 100M bit/sec., you could upgrade your backbone without changing your wiring, offering a new migration path up from the IBM wiring scheme."

Synoptics' technology accommodates shielded twisted-pair

card prices projected for 1994 to market in 1992 or 1993 by accelerating the volume of network interface card components, most of which remain the same for the FDDI and twistedpair cards. He said that twistedpair products could be available as early as nine months from now.

Chipcom and Synoptics intend to license their technologies to adapter card manufacturers, so acceptance by the FDDI standards committee is

"UR GOAL IS to bring the current \$11,000 FDDI per-node connection down by 50%."

STEPHEN DIAMOND SYNOPTICS

(Type 1) cabling only, used mainly in IBM Cabling System installations. Chipcom has developed technologies for shielded and unshielded twisted pair.

Riess said that the 50-meter distance limitation could be a problem in older buildings because "you often don't even know where the wires go. Someone may have wrapped cable around a chair leg on the way to the wiring closet."

Migration to the emerging FDDI standard has been slow because of the high costs associated with electro-optic components, which are shipping in low volume, and the installation of fiber cabling.

"Our goal is to bring the current \$11,000 FDDI per-node connection down by 50%," said Stephen Diamond, marketing manager at Synoptics. Fowler said Chipcom hopes to bring the \$2,000 to \$4,000 FDDI adapter

important for inspiring vendors to manufacture the cards.

The alternative-medium concept parallels efforts spearheaded by Synoptics for allowing 10M bit/sec. Ethernet networks to run over unshielded twisted pair instead of its standard medium, coaxial cable. To that end, technology developed by Synoptics, Digital Equipment Corp. and 3Com Corp. was integrated and developed into a separate standard - 10Base-T - which was completed earlier this year by an ANSI working group. According to Fowler, there are now four million Ethernet/twistedpair nodes.

CORRECTIONS

Eight of the 13 scheduled speakers from IBM did in fact speak at the Comdex/Spring '90 show [CW, June 11].

Lotus steps up Unix effort with 80386 versions

BY PATRICIA KEEFE

CAMBRIDGE, Mass. — Lotus Development Corp. dropped more of its multiplatform shoes onto the desktop last week, releasing four Unix editions of 1-2-3.

The Lotus spreadsheet will run under AT&T Unix System V, Release 3.2 on Intel Corp. 80386-based computers. The four editions of 1-2-3 are for Unix System V/386 offerings from AT&T and The Santa Cruz Operation (SCO), SCO's Xenix System V/386 and Interactive Systems Corp.'s Unix System V.

These platforms kick off Lotus' System V drive because of their combined installed base, which totals 400,000, and mature distribution channels.

Other than support for AT&T Unix System V, the newest additions to the Lo-

tus cross-platform strategy provide the same features as does 1-2-3 for Sun Microsystems, Inc., which shipped in April.

If these ports are successful, some analysts are expecting Lotus to offer a version for IBM's AIX. David Rome, Lotus' director of Unix products, said that Lotus will "investigate and support other versions of [Unix] as our users request it."

Lotus will also wait for Unix customers to indicate which graphical user interface needs to be supported.

In a separate announcement this week, Lotus plans to introduce an upgrade to the government edition of 1-2-3 Release 2.2. Key enhancements include a translation module to support several brands of Unix spreadsheets, the ability to print wide reports on dot matrix printers and an electronic tutorial called Easy Start.

Lotus will also launch an electronic bulletin board in August that will provide federal customers with product updates and

support.

Senior product manager Alan Menard said a government edition of the Microsoft Corp. Windows 3.0-compatible 1-2-3 Release 3.1 will be forthcoming about 30 days after its commercial release this fall. It will include the same enhancements, plus a Datalens driver for the Microsoft/Sybase. Inc. SQL Server.

These introductions signal a renewed emphasis on the government market, where Lotus has found itself squeezed out of at least two major desktop contracts, either for not supporting Windows or Posix-compatible Unix.

While most of the government's 1.6 million installed base of personal computers is Intel 80286-based or smaller, Tom Ruff, Lotus director of federal systems marketing, said that 70% of government agency requests for proposals call for a 386-based Unix system.

Lotus is targeting 1-2-3 for AT&T Unix System V at multiuser installations. A single-user edition costs \$695, the multiuser edition supporting 10 nodes costs \$1,295, and more users may be added for \$495 each.

Oracle, users call support truce

BY JEAN S. BOZMAN

REDWOOD CITY, Calif. — A one-day meeting between top Oracle Systems Corp. executives and leaders of regional user groups produced the desired result last week: a truce that reduced simmering tensions about pricing policies and product support.

"People were pretty skeptical going in. But what they said — and the way they said it — changed our minds," said Richard Goth, a consultant at Cap Gemini America, Inc., who represented the Mid-

west Oracle Users Group.

The meeting held near Oracle headquarters last Thursday was the start of what Oracle calls its Affinity program for users. "They want to develop a relationship in which the users are regarded as partners," explained Tony Ziemba, president of the New York Oracle Users Group. Efforts to obtain comment from Oracle executives were unsuccessful.

According to users, Oracle promised in a written statement to do the following: Disclose confidential corporate information to the Affinity program members; respond to the top five product enhancements requested by users; and provide free access to a technical-support bulletin board on Compuserve. Executives also promised to respond quickly to emergency product support questions and aim for a 48-hour turnaround time.

Top executives made confidential disclosures about Oracle's business — and presented product plans and new support policies. However, they also demanded nondisclosure of confidential materials.

The Affinity program calls for quarterly meetings with the top user-group representatives, including a session at the September meeting of the International Oracle Users Group in Anaheim, Calif. Ziemba said the meetings stem from longstanding user pressure on Oracle executives to address product concerns.

"This user movement has come up from the grass roots," Ziemba said. "We can see that we're getting results, but we won't have a report card on the Affinity program until next year."

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Salaries of IS jobs skyrocket

BY ALAN J. RYAN

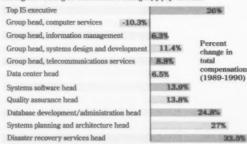
NEW YORK - Serious salary pursuers take note: Pay is on the rise in a big way for three information systems executive positions - systems planning and architecture chief, disaster recovery services chief and database development and administration chief.

According to a study of 31 major U.S. corporations conducted by Edward Perlin Associates. Inc., those three positions experienced average total compensation increases of 25% more this year as compared with last year and had substantial inses in base compensation as well. The study also revealed that in all, the top IS executives' total compensation climbed an average of 9.4%.

The executives responsible for systems planning and archi-

Top dollar

The highest ranking IS executives are seeing hefty pay increases



tecture concentrate their efforts on taking advantage of advancing technology. The disaster recovery services heads concentrate on averting and minimizing the effects of system catastrophes. Also, the database devel-

opment and administration head is important as a focus for corporate efforts to make better use of the data in their systems.

John A. Putney Jr., executive vice-president at Teachers Insurance & Annuity Association in New York, said the big increases in pay scales for the three areas mentioned in the survey may not be an accurate reflection of what is happening at his organization.

For instance, Putney said, his firm's database development and administration positions have traditionally been on the high end of the pay scale, and he did not recall any major changes this year over last. He did say the importance of the disaster recovery function has evolved from a systems perspective to an overall companywide perspective.

Roger O'Connor, a senior consultant at the management consulting firm, said the survey showed that compensation rates in the telecommunications area did not climb as rapidly during the latest survey period as they did several years ago. "The whole telecommunications field in terms of pay practices is starting to ease off a little," he said. Salaries are not moving as aggressively as they used to three or four years ago.

Novell's 386 Netware goes for SAA

BY JIM NASH

Novell, Inc.'s Netware Communication Services is a belated question mark for some information systems administrators and analysts. Others see it as a firm step for Novell into the largecompany arena.

Introduced last week, Communication Services is a platform designed for Netware 386 Version 3.1 networks that will include long-awaited Netware Loadable Modules. One of the modules, Services for SAA, will provide network-to-IBM mainframe connectivity over existing IBM Systems Network Architecture backbones.

Gerry Machi, marketing director for Novell's communications products, said that Services for SAA provides "all the connections" between local-area networks and IBM minicomputers and mainframes. The software is scheduled for delivery this fall. Several users, some of whom are Novell beta-test sites, had yet to hear about it.

For IS managers, the software provides centralized network management and security on Netware's 32-bit operating

Two versions of the Systems Application Architecture (SAA) product will, respectively, support up to 64 and 254 simultaneous sessions, while another combination of modules has been tested with a total of 1,000 concurrent sessions.

Communication Services' reception by users was muted last week. Midway Airlines did not see an immediate need for the product. Bob Thompson, a systems analyst at Midway, said, "Right now, we've set up our own link to the Sabre system" mainframe operated by American Airlines. The Chicago-based airline runs all of its flight-control software from Novell LANs through Memorex Telex Corp. dedicated gateway PCs and to Sabre mainframes

Frank Dzubeck, president of the consulting firm Communications Network Architects, Inc. in Washington, D.C., played down the announcement's significance in LAN-to-mainframe settings.

Services for SAA, Dzubeck said, "is in line with the other vendors' (communications) services." He and other analysts cited similar products fielded by IBM, Banyan Systems, Inc. and a joint product by Digital Communications Associates, Inc. and Microsoft Corp. Machi countered that Novell is the first to link 1,000 concurrent sessions.

OSI/Net Management protocols released

BY ELISABETH HORWITT

NEW YORK - Some 100 computer and networking vendors met last week to release the first full set of network management protocols based on the Open Systems Interconnect (OSI) standard

Some users with long-term OSI plans said they still see commercial, interoperable OSInetwork management products as several years away.

"There's a difference between having something on paper and having it in reality for us," said Tom Nakamura, product manager for engineering design networks at Hughes Air-Co., adding that the "interim, transition period will probably take years

The OSI/Network Management Forum announced Release 1 of a full set of specifications for both fault and configuration management.

The forum fulfilled its goal of bringing out a working set of OSI management protocols well ahead of the official standards bodies, AT&T official William Gilbert said.

Hewlett-Packard Co., AT&T and MCI Communications Corp. were among the vendors that said they would comply with the standard sometime next year. However, users said that it would probably take a lot longer for them to start using those products as a foundation for multivendor network management.

"I think everyone agrees on the concept [of standardized network management], but the reality here is a lot of devices that

don't talk the same protocol" to OSI specifications, said Keith Addison, manager of network integration at G. D. Searle.

We can't have OSI network management until we build OSI networks, and that's still tough to do," Nakamura said.

Andrew Bach, director of communications engineering at Securities Industry Automation Corp., agreed that "seeing is believing" when it comes to stan-dards-based interoperability. He added, however, that his company's Intel Corp. and Digital Equipment Corp. systems using the first four OSI layers "talked together almost at the first shot. We had to pick our jaws up off the

Compaq to plug 386SX into laptop line

BY RICHARD PASTORE

HOUSTON - Compaq Com-

puter Corp. is scheduled today to unveil an SLT laptop computer based on Intel Corp.'s hot-selling 80386SX Observers chip. briefed by Compaq expressed disappointment that the chip will not debut in Compaq's popular LTE notebook family as well.

The new SLT is expected to include the IBM Video Graphics Array display and three-hour battery of its Intel 80286-based SLT predecessor. However, the model will be powered by the fastest SX processor on the market, will add 4K bytes of cache memory and will offer greater hard disk capacities (see chart).

Some SLT 286 users were unfazed by word of the SX version. "We're not constrained by the [286] technology at this point; I don't see it changing our buying habits," said William Harrison, senior vice-president of The Hartford Insurance Group in Hartford, Conn.

"Our SLT is perfectly adequate at this time," added Eric Gilbertson, manager of MIS at Uniroyal-Goodrich Tire Co. in Eau Claire, Wis.

One user pushing the limits of his SLT 286 units is Stephen Rood, a microtechnology manager at Coopers & Lybrand in New York. "It would be something we'd take a look at," Rood said of the SX model. However, he expressed dismay at Compaq's pricing, saying that with a discount, he could buy the more powerful Toshiba Corp. 5200 laptop for about \$1,000 less.

Still, analysts said they expect the new SLT to do well. "It's going to be extremely competitive. and it will be just as popular as the SLT line has been in the past," said Will Fastie, editor of

"The Fastie Report," a Baltimore-based personal computer newsletter.

Still, some analysts had hoped

for an SX-based LTE, Compaq's trend-setting seven-pound note-book computer. "That's the machine that would have made me jump up and down." Fastie said.

However, a Compaq spokeswoman said the firm has yet to find a way to deploy SX technology in the compact LTE. "The system boards in the LTE are too small," she said. Some observers said Compaq should de-liver an SX-based LTE in nine to 12 months.

Compaq is also scheduled to announce today availability of its first desktop unit using the 20-MHz 386SX. The box offers 4K bytes of cache, 2M bytes of memory and hard disk capacity options of 60M or 120M bytes. Prices range from \$3,299 to \$5,299

Lap power

Compaq's latest laptop features the 20-MHz 386SX and hefty hard disk



SLT 386s/20

Weight: 14 pounds

CPU: 20-MHz Intel 386SX Memory: 2M bytes, up to 14M bytes

Cache: 4K bytes

Storage: 60M- or 120M-byte hard disk; 31/2 in., 1.44M-byte floppy disk

Battery life: Three hours

Display: 10-in. monochrome VGA, backlit LCD display

Price: \$6,799 to \$7,499

Closing Arguments

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specifically, a database is open if it works with other vendors' databases. For example, ORACLE provides access to IBM's DB2, SQL/DS and DEC's RMS.

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NSFnet hits the high-speed links

BY ELISABETH HORWITT

WASHINGTON, D.C. — NSFnet, the network supporting nationwide research collaboration, began linking researchers and supercomputer centers at 45M bit/sec. last week — 30 times its previous speed, the National Science Foundation (NSF) announced.

Implementation of Phase 2 of the NSFnet project began on schedule, with six out of the network's 13 nodes due to migrate by year's end from 1.5M bit/sec. T1 links to 45M bit/sec. connections, the NSF said.

NSFnet is also gaining one T1 node and two T3 nodes by the end of the year, one of which will link to the New England Academic and Research Network, the NSF said. The foundation is allocating \$7.9 million to the expansion.

The other seven nodes are scheduled for upgrade next year, according to NSF director of networking Stephen Wolff.

To support the new speeds, IBM developed a new packet-switch architecture, and MCI Communications Corp. will supply 45M bit/sec. network service — neither of which are available commercially (see story below).

The jump from T1 to T3 speeds is a crucial one, given the network's explosive growth during the past year in terms of both the number of nodes and the volume of traffic it supports, Wolff said. Network traffic has grown to more than three billion packets per month, compared with about 125 million packets per month in July 1988, when the T1 network was deployed, he said.

The network will enable a "whole new range of applications" whose bandwidth requirements had restricted them to systems in the same computer center, said Michael Levine, coscientific director of the Pittsburgh Supercomputing Center.

Projects such as global climate modeling involve the regular exchange of complex calculations and visual data among researchers and computers that are looking at different aspects of the problem, Levine said.

Right now, researchers typically collaborate on such projects by "sending a truck full of magnetic tapes," Levine said. "They want to bring turnaround time down from a matter of days to a matter of minutes."

This should begin to be possible with the 45M bit/sec. links and even more so with multigigabit/sec. connections for which research funding was recently allocated, Levine said (see story page 61).

Switched off

IBM essentially had to junk the packet switch it had originally developed for the National Science Foundation and provide "a whole new generation of technology" to support 45M bit/sec. rates, said IBM executive Frank R. Moore.

NSFnet's old packetswitching nodes comprise multiple IBM RT workstations, each of which handles a single T1 link.

The new packet switch, with 50 times more throughput, is a single IBM Micro Channel Architecture (MCA)-based microcomputer, which can be either a RISC System/6000 or a Personal System/2 running AIX, and is equipped with multiple Busmaster cards.

Each MCA card controls either a 45M bit/sec. T3 link over MCI Communications Corp.'s network, or a 100M bit/sec. Fiber Distributed Data Interface link that allows the packet switch to act as an interface between NSFnet and an FDDI campus network.

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Racal-Interlan at end of its LAN Manager rope

BY JOANIE M. WEXLER

BOXBORO, Mass. — Unable to see the light at the end of the LAN Manager tunnel, Racal-Interlan recently pulled the plug on products aimed at interconnecting Microsoft Corp.'s fledgling network operating system with Novell, Inc. Netware local-area networks. The company also dismissed the 15% of its work force associated with the products.

The networking firm's LMN Server, which allows Netware clients to log on to LAN Manager 1.1 file servers, and a prototype product allowing the reverse pro-

cess have both been aborted, although they were rolled out only last February.

"We had to make a cold, hard [return on investment] judgment here," explained Dave Tolwinski, Racal-Interlan's vice-president of marketing, "LAN Manager didn't develop as rapidly as we thought it would, and thus neither did the market for LAN Manager/Netware interoperability."

No commitment

"Everyone was delighted to hear we were developing the LAN Manager/Netware products, but no one was willing to commit to using them," he added. Tolwinski explained that Racal-Interlan perceived structural changes in the market as inhibiting the takeoff of LAN Manager, which runs with Microsoft's OS/2 operating system. One change, he said, was Microsoft's recent decision to depart from its OEM-only distribution philosophy and sell LAN Manager directly.

"We think this will create additional confusion in the market and slow down LAN Manager sales," he said. Tolwinski also cited as a stumbling block Compaq Computer Corp.'s recent reversal of a decision made in February to resell LAN Manager.

Bob Nerz, Racal-Interlan's software product line director, added, "LAN Manager 2.0 [which takes advantage of Intel Corp. 80386-based computers] won't be shipping in high volume until 1991 sometime," a year behind schedule.

Nerz noted that the LAN Manager products may be licensed to another party and that negotiations are under way with vendors who might take over the projects.

Suits charge phony MS-DOS

BY CHARLES VON SIMSON

REDMOND, Wash. — Microsoft Corp. and Everex Systems, Inc. have filed civil charges against a group they claim introduced more than 30,000 counterfeit copies of MS-DOS into the U.S. market, the firms announced last week.

In a series of lawsuits, the first of which was filed under seal on April 6, 1990, the two companies jointly alleged that a total of 16 individuals and business entities in New Jersey and Northern California were engaged in the manufacture or sale of a counterfeit of the Microsoft MS-DOS product marketed by Everex under the trademark Parcorp.

"These lawsuits are part of a vigorous antipiracy campaign by Microsoft," said William Neukom, the firm's vice-president of law and corporate affairs. In addition to pursuing civil suits, the two firms said they will make any evidence gathered available to the U.S. Attorney and the FBI for possible criminal investigation.

The process began in late March when Everex officers learned that a stand-alone version of Parcorp was being sold in some retail outlets. The company does not sell a stand-alone version of the software.

After Everex consulted with Microsoft, the suits were filed and seizure orders were issued to confiscate merchandise from six locations in New Jersey and California between April 10 and May 8.

Business records and more than 1,000 units of allegedly counterfeit products were seized. Several thousand additional units of product and promotional artwork were subsequently turned over by four of the defendants in response to an order issued by U.S. District Court Judge Charles A. Legge.

"We have an extremely strong case and at the moment intend to prosecute all defendants to the full extent of the law," said Debra Vogt, Microsoft senior paralegal.

Persons named as defendants are Joe Fok of San Jose, Calif.; Benny S. Lee, Norman Chan and Susan Chan of Fremont, Calif.; Thomas Wu, Michael Wu and Frank Ho of Edison, N.J.; and Tai Yen Chu, Robert Young and Christi Liang, corporate officers of San Jose, Calif.-based Asia Source, Inc. None of the defendants could be reached for comment.

Because Everex does not sell a standalone version of Parcorp, any versions of the product lacking an Everex system are likely to be counterfeit, the company said. The allegedly bogus product looks very similar to the authentic version but lacks a bar-code or date-code sticker on the package, according to Everex.

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Candle offers status monitor for VTAM

BY JEAN S. BOZMAN

LOS ANGELES — Candle Corp., which makes its \$130 million in annual revenue selling performance monitors for IBM system facilities, announced last week that it had tapped a new market: IBM's VTAM network management software.

The new product, Omegamon for VTAM, applies Candle's monitoring technology to VTAM, a subsystem of IBM's MVS mainframe operating system. In time, Candle intends to consolidate its performance packages for IBM CICS,

IMS, DB2, VM and VTAM on a single system console, Candle Chief Executive Officer Aubrey Chernick said.

"The status monitor is our hub," Chernick said. "It will pull together all our products so that an enterprisewide network can be managed from one place."

Tuning tool

Omegamon for VTAM is, in effect, a tuning package, product manager Mary Ann Armstrong said. It analyzes raw performance statistics, which are automatically collected by VTAM, and displays the results so that system memory can be reallocated to reduce system bottlenecks.

"Before this, we had no tools that would give us that information," said Wahid Abdelnour, senior systems programmer at Home Savings of America F.A. in Irwindale, Calif., which has been betatesting the product for two months. "Now, we can tell how much memory VTAM is using for its buffers and which applications are using that memory." The Home Savings branch operation uses VTAM on two IBM 3090 machines to communicate with other regional offices.

Industry analysts said VTAM, which is nearly 20 years old, has acted as a "black hole" that allowed some applications to drain system resources. However, network managers — even those trained by IBM in tuning techniques — often cannot identify resource-hungry applications without a lengthy system trace.

"IBM gives you the tools to tune VTAM, but they don't give you the VTAM performance statistics you need to do the job," said Bill Strapko, senior software analyst at International Data Corp. in Framingham, Mass.

Among the new package's major features is a virtual-route analysis module, which sends alerts if network traffic exceeds preset levels.

There is also a hot-key to IBM's Netview network manager, so operators can simultaneously monitor VTAM response times and Netview system alerts. Console displays show a variety of parameters on color-coded screens, along with windows and pull-down menus. Among the parameters displayed are tuning statistics, response-time analysis and buffer-pool status.

CGI steers CASE toward networks

BY ROSEMARY HAMILTON

BOSTON — CGI Systems, Inc. took its first step away from the mainframe last week with the introduction of a local-area network-based computer-aided software engineering package.

At the same time, the software company reiterated its commitment to IBM's AD/Cycle and said it will eventually migrate users to IBM's repository from the CGI one.

One early user, who had been running CGI's mainframe-based package called Pacbase, said Paclan allowed him to off-load development from the host system and make the tools more available to us-

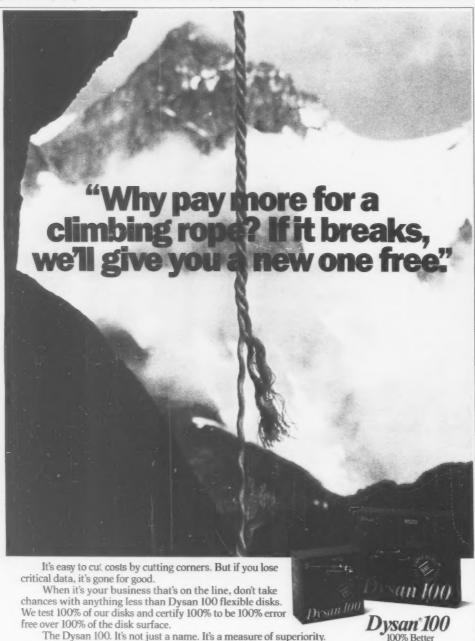
"It brings the tools closer to the developers," said Francois deBeck, director of systems development at the Department of Communications for the Canadian government. "I've seen a difference in attitude of my staff. We are doing a better job than we used to do before because the environment is separate from the mainframe."

CGI will target users who want better response time, do not want to compete for mainframe resources or wish to keep development separate from other processing, company officials said. However, a user can also license a Paclan version that hooks into the host-based system.

The stand-alone version would run on an IBM OS/2-based server and support both IBM Personal Computer and Personal System/2 workstations.

Unlike some other vendors, CGI is not positioning its products as AD/Cycle alternatives. Instead, it calls these products a preliminary step and said it will eventually help users migrate to the IBM repository.

The plan is to make CGI's repository consistent with the IBM plans, which would make the migration smoother, said Dick Ramsdell, chief executive officer. Once users make the move to the IBM repository, they can continue using the CGI tools.



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open mind.

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WANG

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ADVANCED TECHNOLOGY

TECH TALK

Windows on work

Computer users who spend their time peering into a graphical user interface generally are more productive, less frustrated and use more features of their software, according to a study sponsored by Zenith Data Systems and Microsoft Corp. The two companies set out to compare characterbased and graphical user interfaces by observing both novice and experienced users. The results of the study indicated that graphical interface users work faster, complete tasks more accurately and experience less fatigue among other benefits. Chalk it all up to the "navigation theory," which holds that the intuitive icons and menus embodied by graphical user interfaces promote use, exploration and retention of functions in one or more applications - making users more productive and confident, the companies claimed.

Big word for a chip

■ Toshiba America Electronic Components, Inc. recently introduced what it claimed is the industry's first 1M-bit dynamic random-access memory (DRAM) with a 16-bit word width. The new 64K by 16 device is ideal for personal computer and laptop graphics applications, allowing designers to reduce component count from eight to two and increase reliability, according to Avo Kanadjian, DRAM product marketing manager at Toshiba. The devices are available in bytewrite and write-per-bit versions with 80- or 100-nsec access times. Low-power versions are also available. Toshiha said

They see it coming

■ Imaging process business will grow explosively in the early 1990s, according to the Association for Information and Image Management. Industry revenue is expected to climb from \$3.3 billion in 1988 to \$12.7 billion by 1993. It projects that more than half of the 1993 revenue, about \$6.88 billion, will be electronic imaging.

Is a wedded PC-TV in your future?

Despite hubbub, some call HDTV overrated and see PC-TV hybrid as the next wave

BY MICHAEL ALEXANDER

uch has been made of high-definition television (HDTV), the technology that promises to bring 35mm film-like pictures and compact-disc fidelity to home TV viewers. But when HDTV finally debuts in the U.S., the technology will be too late, and in its place will be the "telecomputer," a hybrid television set and personal computer, said several experts who believe that HDTV is much ado about nothing.

'Today's computer already has higher image quality than today's TV set," said William Welty, an analyst at Volpe, Welty & Co., a San Francisco investment firm. "TVs and computers are different in only one regard: Bit mapping allows computers to control an image, while today's TV sets merely display an image. The process

ing power required to control an image is substantial, and it is in this area that we believe major strides are being made that will blur our mental paradigms of the two mediums."

The many supporters of HDTV, which include a consortium made up of IBM, Apple Computer, Inc., Hewlett-Packard Co. and several other computer companies, have promoted HDTV as the cornerstone in a new generation of computer and consumer electronics products.

"HDTV is more than just another pretty TV picture," a re-port on HDTV released by the U.S. Office of Technology Assessment concluded last week. The development of commercial HDTV is linked to several information-age technologies, including digital processing of realtime video; high-performance displays; fast, high-density mag-

netic and optical data storage; technologies for packaging and interconnecting integrated circuits; and more.

Many experts said they think HDTV's potential technological and economic impact has been exaggerated. The television set of the future will be more like a PC, complete with a PC's expansion capabilities, many experts said. Researchers at MIT's famed Media Laboratory in Cambridge, Mass., have been promoting such an "open-architecture TV" for several years, for example.

HDTV is already obsolete because it is based on analog technology developed more than 50 years ago, MIT's researchers and others have argued. The future is in all-digital interactive TV, with which home and office directors will be able to reshape video images any way they wish, rather than merely passively sitting by as couch

potatoes, they said.

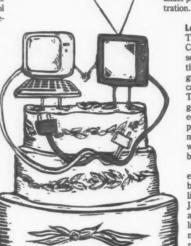
"HDTV is a digression," said Glorianna Davenport, assistant professor of media technology at MIT's Media Lab. At a recent conference on digital multimedia, Davenport said users will have a computer-television capable of scaling and reconfiguring images and taking disparate video bits called "motion picture icons" and linking them in a browser, much in the same way that an Apple Macintosh user might create programs with Apple's Hypercard.

Among the early business applications for a telecomputer will be video electronic mail, messages delivered by talking heads via local-area networks. said Martin Duhms, president of New Media Graphics in Billerica, Mass.

years away, the future of HDTV, at least in the U.S., is no longer as bright as the pictures the technology is capable of delivering.

"HDTV has gotten enormously negative press," said Lawrence Kaplan, vice-president and general manager of the visual systems group at Tektronix, Inc. "There is an incredible lack of understanding; people think that it is [for watching] Gone With the Wind at home. I have grave concerns for our future.'

In April, the Defense Advanced Research Projects Agency (DARPA) announced that much of the \$30 million that it had earmarked for HDTV research had been diverted to other projects. The same month, Craig Fields, DARPA's deputy director and a staunch supporter of HDTV, resigned under pressure from the Bush adminis-



Late for an important date The Federal Communications Commission has said it will not select an HDTV standard until the spring of 1993. However, a group of U.S. broadcasters called the Advanced Television Testing Center that banded together last year to test HDTV equipment has repeatedly postponed the start of testing, thus making it unlikely that the FCC will be able to stick to its timetahle

HDTV systems aim to sharpen TV pictures by at least doubling the number of scanning lines that make up TV images. In Japan and the U.S., TV pictures are composed of 525 scanning lines, and those in Europe are made up of 625. HDTV would put as many as 1,250 lines onscreen

The FCC has already ruled that an HDTV system must be compatible with television sets already in use and stay within the 6-MHz band that TV channels now use.

To get around the limitations imposed by the FCC, several companies are proposing HDTV systems that would simultaneously broadcast HDTV signals along with ordinary signals, using channels that would be kept vacant for the purpose. Viewers with HDTV sets would tune to those channels to watch HDTV broadcasts.

To squeeze the 30-MHz signal bandwidth of an HDTV signal into the 6-MHz band, HDTV advocates are planning to digitize at least part of the signal and compress it before broad-

The FCC's compromise solution will ultimately favor tomorrow's interactive TV, Welty said. Once the signal has been digitized, it could be viewed and manipulated on a television-computer.

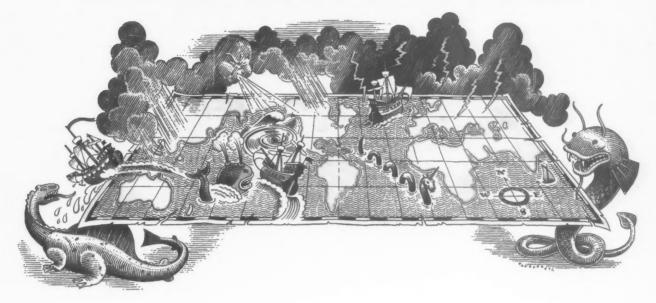
"If you want higher resolution, there are many ways to skin the cat," Duhms said. "HDTV is the brute force way, where you double or triple the number of pixels on-screen. Another way is to process images so that low resolution looks better.

Digitizing a National Television Standards Committee signal, the TV standard used in the U.S. and Japan, and displaying it in real time on an IBM Video Graphics Array monitor would offer a considerable improvement over today's ordinary TV sets, Duhms ex-

Applications such as video E-mail, videoconferencing and video phones, with the PC as the platform, will begin appearing on the market within two years, Duhms added: "HDTV is a sideshow that is probably many years further away

Though the telecomputer is still

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EDITORIAL

Easy does it

HE COMING OF AGE for any industry trend seems to be when a market researcher declares it to be a potential \$10 billion market. Outsourcing is the latest phenomenon to reach that milestone. One market research firm has already pegged 1994 as the year when users will contract out their data processing operations to third parties to the tune of \$10 billion. Of course, forecasters in the past have put forth similar glowing outlooks for videotex, home computing, compact disc/read-only memory and other underachievers.

We don't mean to belittle optimistic predictions or say that outsourcing won't be a major trend, but the issue needs to be put in perspective. Clearly, outsourcing has become a mandatory consideration for users looking to cut their information systems costs. When such Fortune 100 companies as Eastman Kodak and H.J. Heinz Co. contract out significant parts of their IS infrastructure, everyone takes notice. The benefits of outsourcing are apparent: lower fixed costs, easier management and the leverage to play competing vendors against one another. More IS executives are also coming around to the view that saving money for their firm is better for their careers than building a big department. Warner-Lambert IS chief Tom Hippe boasts that his firm is making its IS staff more competitive by encouraging users to solicit project bids from external and internal sources.

But the outsourcing decision is not a nobrainer, and its full implications haven't yet been felt. Several large companies have made major outsourcing commitments in the last two years, but some of those firms have been in deep financial trouble, and cost considerations have played a huge part in their decision.

Users who have taken the plunge also say that cost is among the *least* important issues to consider. The tough nuts are deciding which parts of your operation can be farmed out; who's responsible for integrity, security and liability; and how much control the user firm should expect to maintain

There are also significant business factors working against outsourcing at this point. We now accept as gospel that businesses must decentralize and distribute to keep pace with rapidly changing markets in the 1990s. We take for granted that more control over information is moving to the user's desktop. Finally, the evidence indicates that data is becoming a corporate strategic asset rivaling in importance the actual goods the company produces. How prepared are you to hand that kind of treasure over to someone else for safekeeping?

It's easy to think of the computer room as a utility not unlike the air conditioning or the telephone. We suggest it should be treated more like the factory floor — a life-sustaining function that must constantly be improved to maintain competitive position. The future of outsourcing will hold its share of horror stories as well as successes. While waiting for the dust to settle, don't be too hasty to hitch your wagon to this star.



LETTERS TO THE EDITOR

The code truth

Your article "For better and worse" [CW, May 7] reported that Ada programming projects showed productivity rates ranging from nine to 11 statements per day. In the same paragraph, you reported that Fortran projects experience a productivity of 14 statements per day.

Readers were not given a basis for comparing these figures. As we all know, a system coded in Ada might require more statements than the same system coded in Fortran. To make a comparison of coding costs, one must adjust for this size factor, as well as for differing productivity rates. As no comparative size factor was given, readers could easily have incorrectly concluded that a 100,000-statement Fortran system would have been 100,000-statement system had it been coded in Ada.

Consider what it might have been were the two languages APL and assembly rather than Fortran and Ada!

> Tom Day Litton Computer Services Mountain View, Calif.

More than SNA

We read with interest your storry, "Codex links 9800 to Netview" [CW, April 2], about the new Codex 9800 Integrated Network Management System, which features an interface to IBM's Netview network management system. IBM's open network management strategy encourages companies to develop products that help our customers in this way.

We do wish to emphasize that

We do wish to emphasize that IBM's Netview/PC product also provides solutions for customers who wish to connect non-Sys-

tems Network Architecture devices to Netview. Independent software developers have given Netview/PC strong support, as shown by the more than 40 products that currently interface to it, many running with OS/2.

Michael F. O'Brien Director, Telecommunications Systems Marketing U.S. Marketing & Services IBM

IBM White Plains, N.Y.

Inconclusive?

Your Product Spotlight on frontend computer-aided software engineering [CW, April 9] explored many critical issues to consider in purchasing a CASE product. However, as a consultant experienced in user research, and one who also provided input for the article, I am concerned with both the methods used in gathering the information and the analysis of the results.

Although the results of this survey were largely inconclusive, the headline and article depict Knowledgeware as the clear overall winner. In such a subjective study, differences of even 1.5 may not be conclusive. This is particularly true of a survey that provides 10 choices for each category, making differences between ratings of 6.0 or 7.0, for example, largely inconsequential.

Furthermore, the survey does not provide a clear picture of who responded to the questionnaire. At CASE Associates, we have defined six categories of information systems organizations, and through my experience with both CASE vendors and potential customers, I have found that IS organizational structures dictate product selec-

tion criteria. Therefore, it is difficult to draw gross conclusions from the survey without knowing who responded.

The survey also showed that the respondents, on average, are using CASE for only 47% of their new development work. Perhaps the survey should have identified which firms use CASE for 100% of their new development work. They clearly would be more knowledgeable and committed to CASE technology.

Dave Sharon
President
CASE Associates, Inc.
Oregon City, Ore.

Early birds

Your article, "NCR has pricey power in Micro Channel 486 box" [CW, May 28], noted that "NCR has recently jumped into the 80486-based computer market..."

Actually, NCR entered the 486 market in November 1989, when we were the fist vendor to ship a 25-MHz 486 Micro Channel-based system. Two weeks ago, we were once again early to market with three 486-based products: a 33-MHz server and desktop, and a technology upgrade.

Gary Horning Assistant Vice-President, Workstation Products Division NCR Dayton. Ohio

Computerworld welcomes comments from its readers. Letters may be edited for brevity and clarity and should be addressed to Bill Laberis, Editor, Computerworld, P.O. Box 9171, 375 Cochituate Road, Framingham, Mass. 01701. Fax: (508) 575-8931; MCI Mail: COMPUTERWORLD.

Missing links to unlikely merger

JEFF ANGUS



The evanescence of the nearcomplete merger of Lotus Derelopment and Novell is one of those Thirtyso-

mething false-start relation-ships. When the dominant networking operating system provider agreed to join the stillleading business software company, it looked great to them. But it looked like a kinky combo to the computer industry and financial analysts who couldn't understand how a merger could benefit either firm. This almostmerger is worth discussing, not to rehash what's been said, but what was missed.

Why the merger? This merger could have been the keystone of Lotus' goal of rehabilitating itself. Lotus' strength has rested on one product: 1-2-3. It has taken the revenue this cash cow has generated and invested it in other products, ranging from the visionary (Agenda) to the despicable (Manuscript). In Lotus' area of strength - large corporate customers - its cash cow is highly saturated, giving it smaller opportunities for growth than it would like. So how do you get into markets with lower total saturation and higher growth?

Through Novell, the dominant provider of accounting and

Angus is a manager at Farallon Com puting, Inc., a manufacturer of Macintosh networking hardware and software in Berkeley, Calif.

networking solutions to smalland medium-size companies, a merger partner could have access to the most successful pool of value-added resellers (VAR) in the business.

Novell dealers have access to the smaller sites, are used to selling a technologically complex product and are used to the

chronic support requirements that most networks require. Novell's VAR network would get Lotus into a market it never mastered, with a lot of room for growth. So, what was in it for Novell? That firm's ongoing tug-of-war with Microsoft for control of the microcomputer networking arena has given Novell a healthy appreciation for the power of technological advantage in that part of the market.

What Novell saw Lotus bringing to the partnership was a visionary approach to microcomputer applications. In short, Lotus was a good conduit to a sharp marketing vision of the future - the blending of Lotus' application savvy with No-

vell's system savvy. So the merger made some good sense but probably not enough to justify it. Why?

Mergers don't usually make sense. Mergers don't usually make business more productive. As organizations grow bigger and more diverse, it becomes harder to maintain the special light they followed as smaller concerns. It becomes harder to render creative ideas and change directions.

Donald Clifford and Richard Cavanaugh, in their book The Winning Performance, discuss factors that help companies thrive in changing environments. One of the key factors is the sense that the enterprise is special in what it stands for, what ment of Commerce does a study on the most important inventions in the last 10 years. The results are always the same: Small business is responsible for threequarters of the significant innovations. Big companies don't produce innovation because that is not what they're good at.

If you like free enterprise. you've got to hate mergers on principle. If you work in the information industry, you've got to hate mergers because they

of their self-image in the companies they run. Certainly, for the reasons discussed above, it was in Manzi's interest to make this happen for Lotus' shareholders. In the end, he stopped compromising with Novell when his own authority would have been diminished in

> ing other large shareholders. Did he figure they'd follow him no matter what he did, or did he just not care? Either way, it was an act of pure ego, unfettered by concern for the firm or its shareholders.

have invested massive amounts

the deal. Noorda apparently

made initial pricing decisions on

the transaction without consult-

When Noorda went back to the table to regain points he'd already given away, he violated a cardinal rule of negotiation, terminating the opportunity. If executives can't get their neurotic ego problems out of business, our economy suffers.

Who wins, loses? The evaporation of this merger explains one of the interesting rules of capitalist societies. Mergers usually force custom-

ers to pay more for less innovative product, as larger companies can dominate a market and force its will. This works in industries, such as computers, where distribution systems force out small players.

However, while revenue goes up for the merged mutant, the economy as a whole suffers as the giant wastes resources and loses opportunities to nimbler, more creative, competitors overseas.



it does, and how it does it.

That unity of purpose becomes diffuse as companies combine and try to resolve their cultural and personality differences. Compromise does not work well in culture. It's confusing to the employees, managers and analysts, and more importantly, to the customers.

Mergers also make companies bigger, and that destroys innovation and competitiveness. Every decade, the U.S. Departstand in the way of progress while raising the prices you pay for goods and services.

A failure of nerve. The Lotus/Novell merger failed, not because of the long-term profitability of the arrangement, but for the reason most U.S. businesses are struggling in the world econpinheaded ego battles and short-term gains. The two principals, Lotus' Jim Manzi and Novell's Ray Noorda, are a pair of giant egos who, I suspect,

Pay up, or bombs away

LEE GRUENFELD



that Imagine contract vou with a builder for a new house. After it is completed and you move in, you

discover that the plumbing leaks, tile is cracking and half the windows won't open.

You decide to withhold final payment until these deficiencies are corrected. The builder does not agree with this and informs you that he has built a stick of dynamite into one of the structural members which, when detonated, will reduce your dwelling to toothoicks. This will clearly have a profound effect not only on the house but on your ability to conduct your life normally.

Gruenfeld, a management consulting partner in the Los Angeles office of Deloitte & Touche, specializes in computer-related legal matters, including contracting and litigation.

Disregarding the obvious physical dissimilarities, this situation is not much different from a software contractor placing a bomb in your new system to be detonated upon your failure to submit a due payment.

There have been a number of such incidents lately, taking several forms. In one case, the vendor included code (the bomb) to prevent an application from operating if the system clock had exceeded a certain date. Only if the vendor was satisfied that the customer's payments were current would they update the code to check for a later date.

In another instance, a contract programmer "reclaimed" his disputed software by allowing a similar bomb to go off and render his customer's system

Weak defense

While at first blush this technique might seem a legitimate vehicle for the developer to reclaim property not paid for, it has several problems.

First, in any dispute, there are two sides to the story. It is not necessarily the case that a payment or other obligation is due, it is only the case that the vendor believes it is due. The customer's denial of this may have equal legitimacy, depending on the facts of the case

The problem here is that the vendor has set itself up as judge, jury and, most importantly, executioner, and has denied the customer of its right to protest, to present its arguments to a legitimate forum, to negotiate a settlement or to do any of the other things we all have a right to expect in this country.

Secondly, the potential harm to the customer caused by the sudden disappearance of its system may have repercussions far in excess of the amount in dispute. Imagine an airline or a ticketing service getting shut down over a \$5,000 bill.

Finally, the bomb is a surprise that was not part of the original agreement. Thus, the customer had no opportunity to decline to enter into the contract in the

first place, which it might have done if it knew the risk it faced. The customer's only recourse while a dispute is in process is to seek an injunction to prevent the bomb from being triggered.

Fortunately, there is precedent for this. In 1988, Frank & Sons, Inc., a trucking concern in Oklahoma, sought an injunction to prevent Information Solutions, Inc. from triggering a bomb when Frank & Sons withheld payment pending repair of some bugs. The court granted the injunction and rejected appeals by the software developer for the following reasons:

· The bomb was not disclosed to the customer before the contract was signed. The extraordinary nature of the device made this contrary to public policy.

· Frank & Sons was able to show that it would suffer irreparable harm if the bomb were triggered.

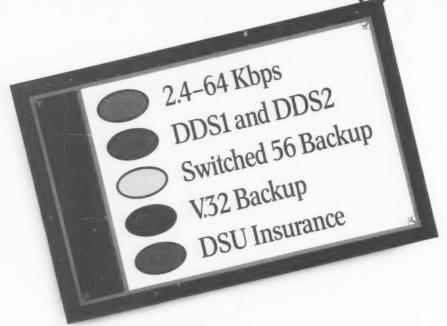
• The harm to the customer would be out of proportion to the harm to the developer. All the software firm would lose is some bargaining leverage (the injuction has nothing to do with its ability to pursue the claim). The trucking company would suffer substantial real damage, before there was any proof that it had even done anything wrong.

· Finally, there was a good likelihood that Frank & Sons would prevail in its contention that it did not yet owe the vendor the final payment.

What if a vendor actually ignites a bomb? According to Ron Johnston, co-editor-in-chief of The Computer Lawver" and a partner at Blanc, Gilburne, Wiliams & Johnston in Los Angeles: "The bomb could backfire and result not only in punitive damages against the vendor but criminal sanctions as well.'

What if the customer is told about the bomb prior to entering into the deal? The threat of such a Sword of Damocles amounts to extortion, which strips the customer of any bargaining leverage and is therefore sufficient grounds to reject the contract and the entire deal, if necessary, Furthermore, it is not a bad idea to include a contract provision whereby the vendor states that no such device exists.

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SYSTEMS & SOFTWARE

HARD TALK J.A. Savage

Place your bets



Like the opening bet in stud poker, Hitachi Data Systems recent announcement of its top-end main-

frame has only the first card showing.

The fact of the announcement, not necessarily its details, is the important news here. It opens the latest round of highstakes marketing poker be-tween HDS, Amdahl and IBM.

In this game, users hold house odds.

The actual delivery of HDS' mainframe is supposed to be a year away. Before then, IBM is supposed to announce a step toward its "Summit" computer, which some analysts have called the J Prime, or perhaps even the long-awaited Summit itself this fall. Amdahl is also on its way to an announcement, as soon as it can finish testing.

HDS opened the game with a decent bet - a four-processor system capable of 150 million instructions per second (MIPS), which everyone believes is set to go eight-way as soon as the company feels like it. It will have a few other nifty features, beating IBM with fiber-optic channels and offering support for

Continued on page 34

Massive speculation

Cray banking on parallel processing, but whose?

ANALYSIS

BY ELLIS BOOKER

MINNEAPOLIS — Massively parallel computing, for years part of Cray Research, Inc.'s long-range research and development efforts, is now firmly part of the vision for the products Cray plans for the end of the decade. The question is: Will Cray build its own parallel processor, or will it acquire one?

Cray's current top-of-the-line computer, the Y-MP/8, uses eight processors; a 16-processor machine, with 10 times the performance of the existing line, is planned for delivery in 1992. A follow-on to the Y-MP/16, with a peak performance of more than 100G floating-point operations per second (FLOPS) and 64 or more processors, is in the planning stages for a 1995 target date, according to Cray sources. Cray has stated that it wants to have a one trillion-FLOPS machine by the end of the decade.

In parallel systems, hundreds or even thousands - of relatively simple processors attack a computational problem. Software has been a stumbling block to the approach, however. Parallel systems require computer code that is "parallelized" — broken into pieces and parceled out to the individual processors. Other issues include how to optimize the work of each processor, how to manage communications between processors and how to handle data dependency in paral-

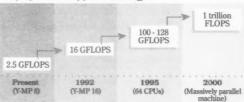
lel environments, where the solution to one problem is dependent on the answer to a previously solved problem.

At Cray's annual meeting last month, for example, Cray officials stated the firm's intention to reach a one trillion-FLOPS machine by the end of the decade but acknowledged that reaching that goal will require a new computing architecture.

"Our view is that [massively parallel] systems are a form of special processors, and we're looking at a strategy to tightly couple these to a general-purpose processor," said Lester T.

Parallel tracks

Cray Research acknowledges that the growth path from its current Y-MP family requires massively parallel technology



Davis, executive vice-president at Cray's Chippewa Falls, Wis., center for engineering and development, during an interview with Computerworld.

Davis added that it would be "a long struggle" for massively parallel systems to replace general-purpose machines. He also said Cray had spent the past year examining the massively parallel approaches of other vendors.

While Cray executives continue to argue that existing massively parallel systems are best Continued on page 36

Software AG touts option to AD/Cycle

BY ROSEMARY HAMILTON

Software AG of North America, Inc. is launching an IBM AD/Cycle alternative this month with the general release of Predict CASE, an integrated set of software tools with a repositorybased engine.

"Our message is, yes, AD/Cycle is the correct approach, but [with Predict CASE] you don't have to wait," said Peter Page, an executive vice-president at Software AG.

AD/Cycle is IBM's application development architecture that will rely on many third-party tools and a host-based repository, which runs on DB2. The repository will hold information about the application develop-

IBM has also stated that AD/ Cycle, introduced in late 1989, will take years to implement, and the integration between the repository and development tools will not exist until next year. The initial version of Repository Manager is scheduled for release this month.

Ready for work

Software AG, on the other hand, claimed to have a more complete product that users could put to work today. The software will work with either Software AG's relational database management system, Adabas, or IBM's DB2. The company plans to make it compatible with IBM's AD/Cycle as those product specifications become more clear, ac-

Predict CASE relies on existing Software AG tools such as Natural, a fourth-generation language environment. The database engine is built into the Predict CASE package, which is a key difference from the IBM offering. With AD/Cycle, users are required to buy Repository Manager and DB2

Page said the repository component, which he called a development database, provides the entity-relationship guidelines for application development. Currently, the company is developing business models, which will reside in the repository. These models can be customized at client sites but will contain up to 80% of the information a customer would need. Page said.

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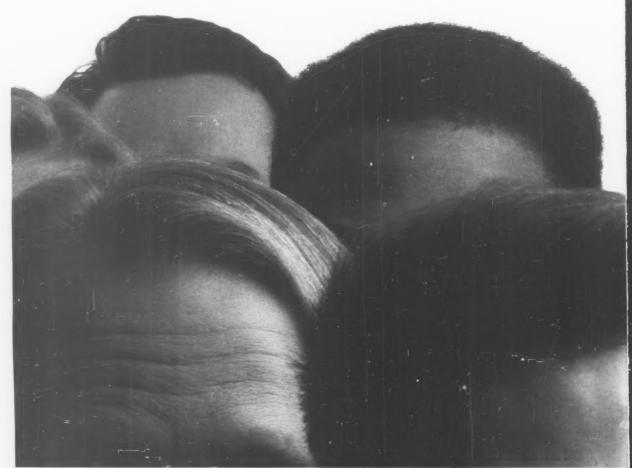
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DEC cites printer cost, functionality

Digital Equipment Corp. recently introduced the Declaser 2000 line of desktop laser printers as a lower-cost, higher-function replacement for the LN03 line of printers.

Slated to be available next month, the Declaser 2100 printers are priced from \$2,399 and the Declaser 2200s from \$3,599 when bought in quantity or with a Decstation personal computer, workstation or VAX system. DEC is billing the new printers as inexpensive enough for personal use but sturdy enough for a shared office environment.

EC IS billing the new printers as inexpensive enough for personal use.

The Declaser 2000 line includes the simplex Declaser 2100 for one-sided printing and the simplex/duplex Declaser 2200 for printing both sides. Each produces up to eight page/min. with a resolution of 300 by 300 dot/in., and each supports multiple paper sizes.

To enhance their use with PCs, DEC will offer an optional protocol cartridge that enables either model to emulate the Canon, Inc. brand of laser printers, which is supported by a large number of PC software applications. Additional software enables users to emulate the Hewlett-Packard Co. Laserjet series of printers as well.

MARYFRAN JOHNSON

Security Pacific's new strategy

The relational database is becoming its cornerstone for global trading

ONSITE

BY JEAN S. BOZMAN

LOS ANGELES — Security Pacific Corp. is making relational database technology the centerpiece of its global trading activities

The bank, the fifth-largest bank holding company in the U.S. with \$84 billion in assets, is loading relational databases in its major trading centers — New York, Los Angeles, Tokyo, London, Sydney and Frankfurt — with transaction data and presenting "slices" of that data on hundreds of MS-DOS-based workstations.

That is all part of an emerging client/server strategy, said Richard J. Harmel, first vice-president of facilities and technology at Security Pacific's Merchant Bank operation.

There is a drive to standardize on a relational database — in this case, Digital Equipment Corp.'s RDB on a DEC VAX. Moving toward standards is a way to homogenize what Harmel said was once "an agglomeration of VAX and IBM VM/CMS applications stuck together with bubble gum and baling wire."

About 14 months ago, Harmel and his staff of 12 software developers embarked on a migration toward a more standard environment — one that will eventually migrate all trading data to the RDB databases. Hundreds of users access these databases daily, collectively trading about \$20 billion per day in 40 currencies. In February, the first phase of this RDB-centered environment went into production. A second phase of the project is expected to add an RDB-based

real-time trading environment by next month.

If achieved, a centralized repository of data would give Security Pacific's trading systems an edge against competitive banks, Harmel said. "Ultimately, I would see many applications going against the same database, as the real-time components of our trading environment come together," he said. "We're [active-ly] discussing now how soon such a thing could be done."

The advantage of using relational technology, Harmel said, is that it allows transaction data to be accessed for pattern analysis and ad hoc queries. For now, older database systems that use hierarchical, indexed or flat-file database structures hold much of the trading information.

Until there is a single system, the bank will have to display information from separate databases on multiwindowed workstations. "A lot of processing is taking place at the workstation," Harmel said. "A relational database environment gives us the foundation to begin with, but we'll still need filters [at the workstation] to turn all that data into useful information."

One source of nonrelational data is a real-time transaction monitoring system that takes a global "snapshot" of all the bank's trading positions. Multiple IBM System/36 machines are used in overseas sites, while Security Pacific Automation Corp.'s IBM mainframes handle most of Security Pacific's back-office order processing.

However, there are links between these dissimilar systems, systems developer Carol Swart explained. One system can dial up many others, allowing Tokyo traders to access Los Angeles files, for example. The Money Market II VAX-based system, which uses a proprietary database to store data about U.S. Treasury bill issues, updates RDB nightly, Swart said.

As trading proceeds, RDB updates can be posted through the Trading Room Inquiry and Capture System, a VAX subsystem. This VAX "process" under VMS taps into the Money Market II data, then combines it with RDB data.

The round-the-clock nature

brella, Security Pacific Automation. The cost of running the computers, however, is absorbed by business units such as global trading. "Security Pacific is doing everything in its power to make itself run more efficiently," Harmel said.

Security Pacific's drive toward standards has gone much further on the desktop than with the bank's database servers. The new "client" workstation, Rapid Access Display and Information Utility System — known as RADIUS — is being offered to traders as one way to sort through the daily onrush of numerical data

RADIUS is based on industry standards, such as MS-DOS and



Alan Levena

Socurity Pacific's Harmel is taking firm to a standard RDBMS

of global trading is crowding out the traditional overnight scheduling for batch updates. "We're expending a lot of energy keeping the databases in sync," Harmel said. "For us, the day begins in Sydney, Australia, and ends in Los Angeles [at 3 p.m.]."

Harmel's computing resource
— several dozen VAX machines
scattered around the world — is
operated and maintained by the
bank's information systems um-

Intel Corp. 80386 processors, to give traders freedom of choice in purchasing spreadsheets and to save on application development costs. "The traders and the dealers [in our operation] are computer-literate, so they know what analytic programs they want to use in their work," Harmel said. "I'm providing them with a spreadsheet environment and maintaining the overall information resource."

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SOFT NOTES

IBM to market social service systems

IBM and Transfirst Corp. signed a deal to jointly market systems for social services such as Aid to Families with Dependent Children and food stamp and unemployment insurance programs.

The two will sell the Trans-

first Accept electronic benefits transfer system to both government and health-care agencies. It provides automated benefit processing that eliminates some of the costs of manually processing and mailing forms and checks. The marketing effort is scheduled to run for four years.

IBM Canada Ltd. and Aion Corp. teamed up to sell Aion expert system tools in Canada. IBM will solicit orders while Aion continues direct sales efforts. The Aion products run on mainframes and IBM Personal Computers.

Ross Systems, Inc., Comshare, Inc. and Price Waterhouse recently formed a trio to sell Ross Systems' product with executive reporting capabilities. Ross will provide the application software and Comshare will contribute its Commander executive information system.

Once Commander is integrated with the Ross applications, Price Waterhouse will provide implementation and consulting services. Ross sells financial management, human resources and distribution software for the Digital Equipment Corp. VAX line of computers.

Boeing Co. recently licensed DMR Group, Inc.'s Productivity Plus, a system development methodology that will be used to create and maintain systems by Boeing's Application Systems Technology group. Productivity Plus includes guidelines, software and training.

HP ties minis to IBM nets

BY JEAN S. BOZMAN

CUPERTINO, Calif. — Hewlett-Packard Co. recently sought to make it easier for its HP 3000 minicomputer users to tie into IBM networks and for new users to get into the HP 3000 line with a plug-and-play system.

HP announced a new release of its proprietary MPE/XL operating system that will give HP 3000 computers greater connectivity with IBM's Systems Network Architecture (SNA).

HP MPE/XL Version 2.1 allows customers to build one backbone network to accommodate X.25 and SNA communications. Among Version 2.1's improvements is the ability for HP systems to trigger network alerts for IBM's Netview.

"We replaced the bottom three layers of our OSI [protocol] stack with SNA transport layers," explained Olivier Helleboid, a product marketing manager at HP's Information Networks Division. "Customers now have the option of running HP-to-HP communications over their X.25 network, or HP-to-IBM communications, or both."

The new low-end system, the HP 3000 Series 920, is intended to speed installation of the system at office sites. "The operating system is preloaded at the factory, and all the peripherals are already installed," HP 920 product manager Sridhar Ramanathan said. "We have an HP technician check the power sources and plug the system into a wall socket." The system is available now for shipment.

The HP 920 unit supports 20 users but can be upgraded four times to become an HP 3000 Model 932, which supports more than 64 users. A \$28,000 system includes main memory of 24M bytes, a 670M-byte hard disk drive, a 1.3G-byte Sony Ltd. digital audio tape backup unit, and HP's Allbase/SQL relational database management system.

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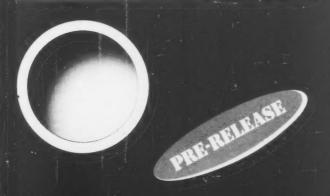
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Savage CONTINUED FROM PAGE 25

24,000 peripherals.

While Amdahl flat-out denies it and IBM simply won't comment, both companies are expected to accelerate the time frame for their announcements, like card players nervously reshuffling their hands, because of HDS' play. They may also feel pressure to hedge their bets by adding (or letting out) more features and better pricing.

Check this out: The new HDS systems, not cheap at \$14.4 million for the top performer, still beat IBM's list price on machines with less growth potential and fewer features by more than 20% in

price per MIPS. According to Gartner Group, Inc. in Stamford, Conn., an IBM 3090 J costs \$116,000 per MIPS, while the new HDS EX 410 will be \$96,000

That is one reason users hold house odds in the marketing game. While Amdahl and HDS always try to start list prices well below IBM, list is just a starting point, and it can only decline from there. HDS has set theirs reasonably.

Also, IBM and Amdahl may be forced to ante up more features. For instance, although current HDS users would have to swap boxes, the investment in memory and channels can be retained instead of going through a new purchase. In the past, Amdahl has reluctantly offered a trade-in option for upgrades. With this on the table, IBM may be forced to make the same concession.

Mark Hess at Gartner Group claims HDS is holding back, that there are several features within the computer that HDS hasn't "turned on" yet.

If the marketing betting gets hot and heavy, IBM and Amdahl may one-up HDS with features, and HDS could retaliate by unleashing a few more of its own while still making the promised shipment date. Users would benefit by having more features up front, instead of having them doled out when the companies need a kicker for their boxes.

The companies might even use the marketing game to bring their machines out more quickly than they would otherwise, although this scenario is less likely for everyone except HDS.

HDS' parent company, Hitachi Ltd., said it would deliver the same box to the domestic Japanese market with a proprietary operating system this fall. HDS should be able to roll out its machine soon after, since the only technology it adds is IBM compatibility.

Amdahl is probably rushing its ma-

chine as fast as it can. IBM has been burned before when it shipped processors and disk drives before they were proven. With the J Prime expected, users might be mollified until the Summit is

While HDS' announcement may cause the usually ho-hum mainframe makers to do a little song and dance for the benefit of potential customers, HDS itself may get limited market share advantage - at least for the first year.

Its current high-end users number between 45 and 50 worldwide, according to the company. That means there are few users ripe for the new machines, and there will be a constraint on supply from Hitachi.

Iim Cassell, also with Gartner Group. estimates sales between 10 and 15 in 1991. At the same time, IBM ships in the thousands.

HDS is a patient company. It was almost humble on announcement day, es chewing dry ice and laser shows for food and decoration. It is going for the long haul and is expecting to grow incrementally, not take the market by storm.

In that respect, patience may be aided by HDS' relationship with its parent. Hitachi puts out almost all the money for research and development. Hitachi takes the risk, and all HDS does is buy the box from them and add compatibility.

Amdahl, which has been griping for over a year about not being able to make much money on its high-end machines, puts more money into hardware design and takes the risk on development.

Savage is a Computerworld West Coast senior cor-

Storage Tek's family expands

Storage Technology Corp. recently finetuned its tape library system with a new release of its host software as well as a new software package that adds automated functions to the tape management pro-

The 4400 Automated Cartridge System is a tape storage and retrieval system that relies on robotics and software to manage a tape library.

The latest release of the Host Software Component will provide an interface from the operating system to the 4400, the company said. It will also support the company's Improved Cartridge Recording Capability.

The Expert Library Manager software package provides improved automation for such tape handling functions as scratch, slot and removal.

The host software is slated to be available later this month with an initial license fee of \$13,500. Expert Library Manager is scheduled to be released in August with an initial license fee of \$6,000, the compa-

ROSEMARY HAMILTON



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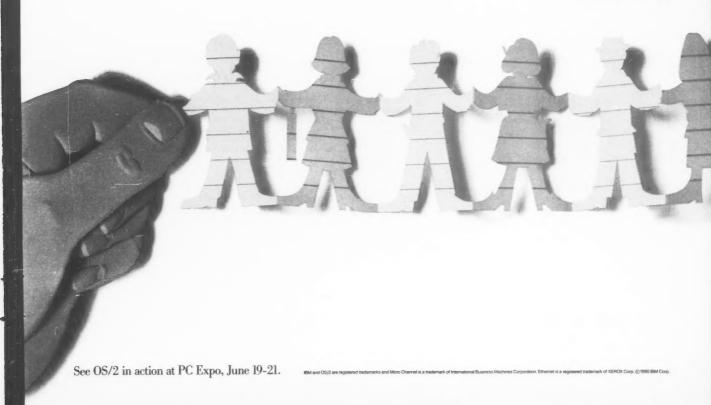
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Cray

FROM PAGE 25

for "niche" applications, they have recently suggested that the addition of such a system as a subsystem to Cray's own machines might be feasible.

"They could get in by acquiring a [parallel processing] company... I imagine there are quite a few who would welcome such a move," said Omri Serlin, editor of the "Serlin Report on Parallel Processing," a monthly newsletter based in Los Altos, Calif.

Possibly foreshadowing an acquisition strategy was Cray's entry into the minisupercomputer market earlier this year. In March, it signed an agreement in principle to acquire Supertek Computers, Inc., the maker of a computer system compatible with Cray's now-discontinued X-MP product line. Cray has said it will port its Unix operating system, Unicos, to the Supertek SL-1 and that a Y-MP-compatible machine is in the wings for the second half of 1991.

However, Patricia Laupheimer, vice-president of research at Shearson Lehman Hutton, Inc. in New York, said she does not believe Cray will need to go outside to get the hardware for a parallelizing system.

"I don't see why Cray can't do that as well as anybody else," she said, adding that she would not be surprised if the company turned to others to help it with the software side of the puzzle. "I would be surprised to see Cray fall behind in general-purpose supercomputing — which is to say that when the technology is ripe, Cray will be there," Laubeimer concluded.

"I personally don't believe you can get to [teraflop] levels without massive parallelism . . . over 100 processors," said David Micciche, vice-president of marketing at BBN Advanced Computers, a division of BBN Communications Corp. in Cambridge, Mass.

BBN Advanced Computers announced its current machine, the TC2000, in July 1985 and to date has installed a total of 13 machines worldwide — ten in the U.S., two in Japan and one in Europe. The company's largest sale to date was a \$4.5 million, 126-processor system to Lawrence Livermore National Laboratory in Livermore, Calif.

In April, BBN underwent a 300-person staff cut across its operating units and repeated its statement from the beginning of the year that it was seeking "strategic alternatives" and additional investments.

Asked if BBN was talking with Cray about such strategic relationships, Micciche had no comment. A Cray spokesman confirmed that talks with BBN have occurred but said that they had been concluded.

However, achieving a 1-trillion FLOPS supercomputer the Holy Grail of the high-performance computing industry may be problematic, even with a massively parallel architecture.

According to a study presented by IBM last November, even massively parallel systems based on current technologies will have trouble reaching the 1-trillion FLOPS objective. The analysis predicted that it would take 2,566 NEC Technologies, Inc. SX/2 processors, 7,376 Cray Y-MPs or more than 24,000 IBM 3090 S-class mainframes to reach a 1-trillion FLOPS rating.

ECC returns to start for system rebuilding

ONSITE

BY MAURA J. HARRINGTON

ATLANTA — It's not that often that information systems managers have the opportunity — or challenge — to rebuild their systems from the ground up.

When Joe Knesz was given the opportunity to decide how ECC America, Inc., a division of English China Clays International, would be replacing its IBMbased system, he jumped at the chance to make some changes.

"We're in a unique situation in that we're starting [over] from scratch.... I think the opportunity is positive." Knesz said.

Knesz and his superiors at ECC America had decided to get rid of the two IBM System/34s and one System/36 that had been used for 10 years and replace them all with a new Digital Equipment Corp.-based platform. However, just when Knesz thought everything was under control, ECC America acquired Georgia Kaolin, Inc., which runs its operations on three IBM System/36s, Knesz said.

In justifying the move to DEC, Knesz said, the bottom line was software. The IBM Application System/400 hardware that ECC America would have upgraded to "lacks the versatility of the DEC VAX environment that we felt was needed" for the

software systems, Knesz added.

The VAX environment will include a VAX 6310 at each of the two production locations and a Microvax 3400 at a third production site, as well as another Microvax 3400 at ECC America's corporate headquarters in Atlanta.

The VAXs, which are located in Georgia, Alabama and Texas, will then be hooked together through a Decnet wide-area net-



work. In addition, there will be a Novell, Inc. local-area network hooked up to each respective VAX via a gateway at each location, Knesz said.

The new system was scheduled for completion by the end of 1991, but the acquisition of Union, N.J.-based Georgia Kaolin, which came about after the system choice, pushed the date of completion back by at least a year.

Like ECC America, Georgia Kaolin is a mining company with operations in Georgia that process the mineral Kaolin — a fine, powdery substance that is used to manufacture a glossy material, which is in turn used to manufacture magazinelike paper, glossy paint, ceramics and more,

according to Knesz.

"The merger will double our size from a revenue standpoint, From a systems standpoint, they are currently on three System/36s, and the strategy is to initially bring them into our new systems as quickly as we can," Knesz said.

Chosen challenge

While Knesz claimed that a DEC platform is his platform of choice for running the systems and applications software chosen, finding out about the Georgia Kaolin acquisition halfway through integration has made his job more challenging. However, Knesz said, he is still happy with his choice, and integration of the IBM systems will not interfere too much with his plans to finish getting the new DEC platform up and running.

"This [acquisition] obviously puts the pressure on us to move quickly," Knesz said, "but eventually, the conversion will be made by bringing their business software into our Ross Financials package, so we can convert their system onto the DEC plat-

Although he does not know when the two systems will be completely merged, Knesz said that he hopes to keep the Georgia Kaolin project separate from the VAX project as long as possible.

ble.
"We hope the software integration will be completed within a year. Eventually, we will convert their system to DEC, too," Knesz said.

"I guess this is an example of what makes life so interesting," he added.

NEW DEALS

UK mail to run Nonstop

The British post office recently chose the UK subsidiary of Tandem Computers, Inc. to supply its first systems for automating over-the-counter services for 21,500 post offices. The Thames Valley Project pilot will initially link 250 post offices, banks and motor vehicle license centers to a central Tandem quadprocessor Nonstop VLX system. The British post office averages 2,000 trans./day, from selling stamps to taking large cash deposits for the National Girobank.

Maspar Computer Corp. has announced the first European sale of its massively parallel computer system, the MP-1, to the University of Bergen in Norway. Introduced in the U.S. in January, the MP-1 will be used in the university's department of informatics, a parallel processing laboratory.

Ferguson Enterprises, Inc., the nation's largest supplier of plumbing, heating and industrial supplies, has purchased a \$5.8 million fault-tolerant Sequoia Systems, Inc. Series 300 computer to automate its multilocation distribution business. The system, which Sequoia said will be the largest it has ever installed, will support more than 2,000 simultaneous users.

Israel Aircraft Industries (IAI) and Digital Equipment Corp. have announced a \$25 million joint development venture to integrate IAI's computer-aided design, manufacturing and engineering functions over the next five years. IAI has agreed to buy hundreds of Decstation and Vaxstation machines plus software and services. The aircraft firm will also participate in DEC's aerospace integrated management system programs, along with General Dynamics Corp.'s Convair Division.

HARD BITS

Concurrent ports security

Concurrent Computer Corp. has signed an agreement with AT&T to port its System V/MLS multilevel security system to RTU, Concurrent's real-time Unix-based operating system. Tinton Falls, N.J.-based Concurrent said it expects to offer the combined multilevel security operating system by February 1991 for its 6000 and 8000 series computers.

Data General Corp. will be porting AT&T's LAN Manager/X software to its Unix-based Aviion line of workstations and servers. The licensing agreement with AT&T allows DG to offer LAN Manager/X customers a Unix-based software development platform and a range of applications built on DG's client/server Aviion architecture.

The DG version of LAN Manager/X will be introduced by the end of this year, according to the company.

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Types of equipment with which you are personally
involved either as user, vendor, "crossultant."

A. Maintrames/Superminis
B. Minicomputers/Small Business Computers
C. Mi-crocomputers/Deaktops
D. Communications Systems
E. Local Area Networks
F. No Computer involvement

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NEW AT DEXPO EAST

The following products, services and new technologies will be announced at the Dexpo East exhibition in Boston on June 26-28.

Utilities

Integrated Software Design, Inc. will feature its On-Tap/VMS bar-code labeling and printing software package.

The product enables users to add bar-code printing capabilities to application software by placing a mark at any spot in a document where a bar code should be printed. Users can also create files with bar codes and send them to a local printer, print queue or remote printer in a network, according to the vendor.

On-Tap costs between \$1,995 and \$4,995, depending on type of Digital Equipment Corp. VAX configuration.

Integrated Software

171 Forbes Blvd. Mansfield, Mass. 02048 508-339-4928

Computer-aided software engineering

Synthesis Computer Technologies, Inc. will unveil an integrated computer-aided software engineering application development system designed for the Digital Equipment Corp. VAX/VMS environment.

Case/ap is based on an advanced Cobol code generator. It enables users to define and create initial prototypes and refine them through an iterative process until a final application is completed.

Pricing ranges from \$5,000 for a Vaxstation configuration to \$75,000 for installation on highend VAX systems.

Synthesis Computer 5199 E. Pacific Coast Highway Long Beach, Calif. 90804 213-494-4069

Applications packages

Total Tec Systems, Inc. will introduce an intelligent method of managing and using textual data.

The Nets natural English language text search system is based on a Key Concept search engine in which a user interface allows English questions and commands to be processed against textual information.

The system runs on an Intel Corp. 80386-based associative processor networked to a Digital Equipment Corp. VAX machine.

Pricing begins at \$50,000.

Total Tec Systems
2 Gourmet Lane
Edison, N.J. 08837
201-906-6500

Compushare, Inc. will announce an addition to its Order Entry/Inventory Control series.

Kits, a single-level bill of materials processor, was designed for use by wholesale distributors and manufacturers.

The product runs on Digital Equipment Corp. VAX/VMS systems and is priced from \$25,000 to \$50,000, depending on type of CPU.

5214 68th St. Lubbock, Texas 79424 800-356-6568

Maintenance equipment

Intra Computer, Inc. will announce its SAM3010 disaster prevention system. The system monitors computer rooms for changes in temperature or humidity, detects problems with smoke, fire or water and automatically shuts down host systems during critical conditions when help does not arrive within a given amount of time.

The SAM3010 disaster prevention system has a list price ranging from \$6,900 to \$8,500, depending on the type of system being monitored.

Intra Computer, Inc.

Intra Computer, Inc. 87-46 Van Wyck Expressway Jamaica, N.Y. 11418 718-297-5500

Data storage

Raxco Software, Inc. will introduce two tape management systems for Digital Equipment Corp. VAX/VMS systems.

Tapecontrol was designed to monitor and manage the activity of magnetic tape storage on VAX/VMS computers. The command-line-driven system includes menu-driven interfaces to assist in data retrieval and tape library management. The product costs between \$2,350 and \$19,500, depending on VAX configuration.

Tapeconvert facilitates the conversion of tapes between VAX (ASCII) and IBM (EBC-DIC) or other foreign tapes. Pricing ranges from \$2,150 to \$5,150, depending on VAX configuration.

Raxco 2440 Research Blvd. Rockville, Md. 20850 301-258-2620

NEW PRODUCTS - SOFTWARE

System software

IBS Corp. has announced Version 3.0 of its Quick-Talk Conference for help desks and training automation.

The software package provides help desk personnel with a nondestructive, instantaneous method to capture, track and analyze data pertaining to on-line problems or pass it on to second-line support staff. The package also includes all necessary tools for performing live application training without disrupting the environment, the vendor said.

Release 3.0 is available for IBM MVS and ESA installations. Pricing for perpetual licenses or leases varies from \$12,500 to \$19,000.

4660 La Jolla Village Drive San Diego, Calif. 92122 619-452-6045

Cybra Corp. has announced a user support tool for applications software developers who support different customers.

Widescope enables operators of IBM System/38 or Application System/400 systems to view users' screens displayed on other terminals, browse users' job logs and locate problems without re-creating them. Authorized programmers can reportedly initiate actions and commands that will be followed out on a user's terminal.

Pricing ranges from \$640 to \$3,600, depending on CPU. Cybra One Riverdale Ave. Riverdale, N.Y. 10463 212-601-7100

Database management systems

At the International DB2 Users Group meeting last month, Must Software International announced enhancements to its Nomad DB2 interface.

The product now supports static access to DB2, thereby enabling Nomad applications to be predefined and bound. The interface features an integrated computer-aided software engineering tool that automates the creation of Nomad applications that provide static DB2 access.

The enhanced interface is slated to be available in the fourth quarter for \$3,500 to \$21,500, depending on CPU

Must Software 4th Floor 101 Merritt 7 Norwalk, Conn. 06856 203-845-5000

Applications packages

Computations, Inc. has developed the Commitment Management System, a mainframe software package designed to help life insurance companies manage their commitment requirements.

The on-line, real-time system provides complete document review and approval procedures; comprehensive controls for receipts, disbursements and accounting of fees incurred during the commitment process; a cash-forecasting facility; a general-ledger interface; and text and

tickler notification capabilities. Pricing ranges from \$50,000 to \$75,000, depending on portfolio size used.

Computations 2500 Windy Ridge Pkwy. Marietta, Ga. 30067 404-952-7854

Cincom Systems, Inc. has announced Release 7.0 of its Control: Manufacturing package.

The product includes a standardized user interface, and its manufacturing modules feature screens that were redeveloped using design standards derived after the Common User Access standards for character-based terminals.

Pricing ranges from \$80,000 to \$475,000, depending on type of Digital Equipment Corp. VAX/VMX or IBM MVS/VSE environment.

Cincom 2300 Montana Ave. Cincinnati, Ohio 45211 513-662-2300

System Support Products, Inc. has announced Release 3.0 of Deskworks, an interactive spreadsheet program designed for users of IBM's Application System/400.

The upgraded software package stores spreadsheets as compressed files and includes two new commands: PRTSPR (Print Spreadsheet) and CLCSPR (Calculate Spreadsheet). These commands can be used in interactive or batch jobs to print or calculate spreadsheet edit sessions.

The product is available for a one-time license fee of \$695 for all AS/400 models.

System Support Products 7620 Arlen St.

Annandale, Va. 22003 703-642-8760

NEW PRODUCTS—HARDWARE

Turnkey systems

Concurrent Computer Corp. has announced Release 2.0 of its Topswitch electronic funds transfer, automated teller machine (ATM) and point-of-sale (POS) processing system.

The product incorporates hardware and application software that can reportedly drive from 10 to 10,000 ATM or POS devices, depending on the configuration used. Topalert software automatically calls a predetermined phone number if problems occur.

A basic system that can drive 24 ATMs at 2.5 real-time ATM trans./sec. is priced at \$250.000.

Concurrent Computer 106 Apple St. Tinton Falls, N.J. 07724 201-758-7000

Processors

Harris Corp.'s Computer Systems Division has announced the Night Hawk 4400, a multiprocessing real-time computer system based on reduced instruction set computing (RISC) technology.

The system includes four Motorola, Inc. 88100 RISC processors on one board to provide processing of 80 million instructions per second. Motorola's Hypermodule CPU packaging provides the Night Hawk 4400 with M88000 RISC architecture in clusters that include one, two or four 88100 processors.

The product is slated to be available in the fourth quarter from \$58,500 to \$93,500, de-

pending on configuration. Harris 2101 W. Cypress Creek Rd. Ft. Lauderdale, Fla. 33309 305-973-5125

I/O devices

Carroll Touch, Inc. has announced a scanning infrared touch input system for the NEC Multisync XL color monitor.

The add-on product includes an infrared touch frame with an on-board controller and a wall-mount power supply. The company's line of infrared touch systems are based on an optomatrix frame that encompasses the computer display.

It is being sold in quantities of 100 for \$713 apiece. Carroll Touch P.O. Box 1309 811 Paloma Drive Round Rock, Texas 78664 512-244-3500

Distributed Logic Corp. has announced a disk controller that enables users of Digital Equipment Corp. Microvaxes to add multiple SMD/SMD-E Winchester disk drives to their systems.

The Model DQ3256 handles up to four drives with transfer rates up to 3M byte/sec. It is compatible with the DU drivers in VMS and Ultrix operating systems. Features include dynamic transfer segmentation, which facilitates data reads in multiple drive subsystems.

The product is available at a list price of \$2,495.

Dilog

Dilog 1555 S. Sinclair St. Anaheim, Calif. 92806 714-937-5700



Now that everyone agrees how a computer should work,

Judging by what you see on magazine covers these days, the world now wants what the Macintosh® computer has always had. And, suddenly, the idea that a personal computer should work the way people do has been embraced by virtually every major player.

Well, since "Mac-like" is the promise on every lip, this might be a good time to point out just what a Mac" is like.

What makes a Macintosh a Macintosh is not just cheerful icons, a mouse, pull-down menus and other surface manifestations.

A Macintosh is a Macintosh from the inside out. Conceived from the chip up to work intuitively and visually.

Because it's truly consistent, the entire family of Macintosh personal computers all run the same software with identical point-andclick simplicity. Because it's a true system, Macintosh printers and other peripherals all connect together quickly and logically. Just plug them in and turn them on.

Because we engineer both the hardware and its operating software, Macintosh runs with the smooth speed and precision you'd expect from any perfectly integrated design.

And because Macintosh isn't a "graphical" shell grafted on top of a character-based system, it doesn't expend lots of expensive computing power trying to do something it wasn't designed for.

Which is why, for less than it usually costs to buy the software and the high-end hardware needed for a Mac look-alike, you can have the true article.

Instead of making do with a handful of graphicized programs, you can choose from the thousands of highly innovative business appli-



try the only one that actually works that way.

cations developed specifically for Macintosh over the last seven years. And instead of patiently following the long path from yesterday's MS-DOS to Windows in the interim and to OS/2 in the someday, you can make one simple step to Macintosh.

The benefits of that step, according to a new independent study* by Diagnostic Research, Inc., are considerable.

It seems people prefer a machine that works like people do. And they get more done with it: Users rated Macintosh 14% higher for overall satisfaction and 13% higher for performance than for PCs running Windows. Which, according to information managers in the same study, translated into productivity ratings which were 32% higher.

Meanwhile, what would you sacrifice by making the change to Macintosh? Not your PC files. Every Macintosh equipped with an Apple°

SuperDrive" disk drive moves information between a Macintosh and an MS-DOS or OS/2 PC on standard 3½-inch floppy disks.

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We invite you to call 800-538-9696, ext. 875, for the names of your nearest authorized Apple resellers.

Then come in and see what inspired the monumental changes you've been reading about.

After all, now that everybody else is trying to sell you a Macintosh, maybe you should buy one.

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And the WY-150 is compatible with a wide range of operating systems. Including UNIX,

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It also establishes a number of advanced ergonomic standards. The 78 Hz refresh rate eliminates any hint of flicker. Just as overscanning and a bezel that matches the soft, paper white phosphor erase distracting borders. (Amber and green phosphors are also available.) The oversize 10x16 cell makes each crisp character stand out clearly and vividly.

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PCs & WORKSTATIONS



Don't hold your breath



Forget about the overpriced Macintosh portable, which is about as luggable as a cinder block. Stop

moaning for a low-cost Macintosh. And who cares if the arrival date of System 7.0 moves further back each time John Sculley slips into a brand-new Italian suit?

Apple's greatest challenge today — especially in selling to the big-bucks corporate accounts it is always crowing about — has nothing to do with filling in the cracks in its current product line. Apple executives say those deficiencies are on the road to correction.

Instead, Apple needs to concentrate on filling in the blank that is driving more and more users into fits of hair-pulling frustration: Providing an adequate service and support infrastructure.

Take Kim Arledge, for instance. From her office perched high above the University of Texas campus in Austin, Arledge can see a lot of things: the magnificent beauty of the central Texas hill country, the roiling storm fronts that regularly sweep through the area, birds

Continued on page 54

Is PC industry becoming deathly dull?

Windows gala proves that showmanship now outweighs innovation

ANALYSIS

BY CHARLES VON SIMSON and PATRICIA KEEFE

Cool! It's Microsoft Corp. Chairman Bill Gates' talking head, larger than life, extolling the virtues of his pet project, the latest, super-duper version of his windowing interface for DOS.

Wow! A user gets sucked through his screen into the fantastic and wonderfully wacky world of behind-the-scenes Windows 3.0 goings-on.

Oh, brother. Attendees stand

and cheer the arrival of a product that has taken years to perfect.

The thunder and glitter surrounding the recent unveiling of Windows 3.0 was such that one San Francisco radio newscaster actually compared Gates to Preston Tucker, the legendary automobile maker whose innovative designs terrified Detroit in the 1940s. That kind of talk raises the question of just how much salesmanship is too much.

The media, users and developers all promised they would not be tricked into caring about something as trivial as the next version of an interface, but most in the industry talked about it. People laughed at the lameness of his presentation but packed halls in several cities to see it.

Is Gates and his beloved Windows that sparkling? No, it's more likely that the personal computer industry has become that boring. Wall Street analysts recently have been saying repeatedly that the industry needs something more than word processors and spreadsheets to really take off again.

Preston Tucker didn't need a seven-foot video screen. He might have used one had it been available, but then he would have walked into the crowd to press the flesh, to make people buy into his idea and his product. Those at the Windows 3.0 announcement saw a stiff Gates, on the other hand, steering as far as he could manage from the crowd.

At the Windows 3.0 event, software publishers spread out across the land could be found pitching the wonder of what analysts and users received as mostly mundane products.

With few exceptions, about the best anyone could do in the way of innovation was the solitaire game that Microsoft is including in Windows. After that, it was tool kits and word processors, much the same as it has been for the last 10 years.

Continued on page 53

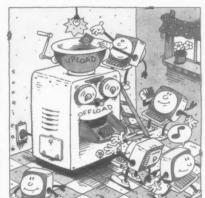
FEATURE: DOWNSIZING

Coding cooks on personal computers

BY PATRICIA KEEFE

recent survey reported that 40% of us work more than 40 hours a week, and 20% work more than 50 hours a week. Programmers were too busy to answer the survey." — Humor item from the June 1990 "Multimedia Reborter"

Ain't it the truth. In information systems shops across the country, legions of mainframe programmers are toiling endlessly on a treadmill of backlogged applications. Standing on the sidelines are impatient users and idea-wielding executives exhorting them to code ever faster. Unfortu-



Fred Sch

nately, many mainframe shops have already hit the wall in terms of processing power, programming costs and applications delays.

For many companies, more big iron is not the answer. Instead, they are taking their cue from the application downsizing trend and have begun to push the development cycle for mainframe packages down to personal computers, so-called programmer workstations and the occasional minicomputer. In this way, companies can code off-line on PCs and then upload the code onto the host. In many cases, this strategy is paying off.

For example, in 1982, Bryce D. Segar was asked to take charge of a seemingly endless development cycle

Continued on page 53

The COBOL Programmer Workstation and Its Impact on Productivity The Micro Focus Developers Seminar Schedule

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Aug 14th	Charlotte, NC
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Aug 28th	Salt Lake City, UT

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architecture make the host. environment a lot easier to work with. Namely, the Apple® Macintosh®

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host applications that allow these applications to continue to evolve without modification of desktop software.

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for your users to request and update information from host databasesregardless of

20,000 Net We're Still Makin



new groundwith a range of product offerings that give new

meaning to the terms "host accessibility" and "connectivity." And we're doing it with a computer whose graphical user interface and integrated

Thanks to third-party software known as Mitem-View, vour developers can quickly create a "point and click" interface for Macintosh-to-mainframe applications without making any host modifications.

And with a unique Macto-host software tool set known as Mac-Workstation.® developers can create friendly

front-ends to



what type of network technology, host system architecture, or DBMS they are using.

Another developer tool, MacAPPC, even allows the creation of Macintosh applications for cooperative processing in IBM's LU 6.2 SNA environments.

And with our newly formed alliance with KPMG Peat Marwick, Businessland can assist you in planning and developing exciting new custom applications using these products.

MACINTOSH CONNECTS TO THE BEST NETWORK SERVERS.

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works Later, g Network News.



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Heartbeat of hospital lies in diagnostic system

ONSITE

BY CHARLES VON SIMSON

PALO ALTO, Calif. — In hospitals across the nation, sophisticated electronic heart monitors absorb enormous amounts of data on the health and progress of patients. A doctor then takes the information about blood pressure and heart rates and records it on a paper chart with a pen.

Much is lost in the translation. Even in the heart of Silicon Valley, the primitive data interpretation methods used by doctors at the Veteran's Affairs Medical Center could not keep up with the wealth of information being supplied by diagnostic equipment.

"The process was errorprone and time-consuming," said Dr. Adam Seiver, chief of general surgery at the center. "We were at the mercy of bad handwriting, errors in math and differing methods of entering data."

In November 1989, the center completed the installation of 23 Sun Microsystems, Inc. workstations aimed at supporting clinical activities, including 14 workstations in the intensive care unit.

The Unix systems run propri-

etary applications software from Emtek, Inc., a Tempe, Ariz.based medical systems integrator. The units are linked to each other and to diagnostic equipment via Ethernet and Sun's Network File System protocol.

Using the computers, doctors can call up a screen that shows which patients are in which beds. To access patient information, doctors click a mouse to select the appropriate bed number. A spreadsheet format then appears, with the vertical axis showing up to 48 categories of information such as blood pressure and fluid intake/output. The horizontal axis shows the progression of time, typically in one-hour intervals.

While some information, such as fluid intake, must still be keyed into the system, much is updated automatically from electronic diagnostic machines. The hospital ultimately plans to auto-



Hospital uses Sun workstations for better patient care

mate even fluid intake by using infusion pumps that will communicate their activity to the network. Seiver stressed, however, that such information will still be verified by nurses or physicians.

"Before we installed the system, we could never fully trust our intake and output figures," Seiver said. "We frequently had to track as many as 14 intravenous inputs and five outputs on a patient, calculate totals and hope the handwriting was legible. Now the whole process is automatic and accurate."

In addition to automating and standardizing the collection of data, the system gives doctors a better picture of trends in a patient's condition. With a paperbased reporting system, doctors could not get a clear picture of a patient's status from the full range of diagnostic information.

"We were surrounded by all

this empirical data, but because we didn't have the tools to interpret it, we had to resort to intuition for many decisions," Seiver said.

The system has also replaced paper filing in storing patient information. Every minute's worth of information is saved on the system for 24 hours; after that it can be saved as designated by doctors — typically at hourly intervals for stable patients. The on-line record gives doctors an easy method of tracking progress and reaction to treatments.

"Previously, we kept patient records at bedside for 48 hours and then stored them in file cabinets," Seiver said. "Digging out those records to review changes in health and treatments was a daunting task, particularly because it was hard to maintain them in chronological order."

Take Borland boasts with grain of salt

BY CHARLES VON SIMSON

SCOTTS VALLEY, Calif. — Borland International was playing fast and loose with market numbers last week, making some heady, but unsubstantiated, claims about its momentum in the personal computer spreadsheet arena.

However, while analysts acknowledged that its Quattro Pro software has made strong gains against products from Lotus Development Corp. and Microsoft Corp., none would confirm the company's dramatic numbers.

Two weeks ago, Borland announced that its spreadsheet market share in the U.S. and Canada had increased from 5% in the second quarter of 1989 to 28% for the first quarter of 1990, according to figures derived from the Software Publisher's Association (SPA).

The SPA distanced itself from Borland's findings, saying that it provided only raw data to members and that much of the interpretation was based on confidential member-provided sales num-

bers. The SPA provided aggregate numbers on product shipments, and Borland used its own confidential market figures to derive its percentage of the SPA's total. "I wish they wouldn't do that," said Ken Wasch, executive director of the SPA. "That kind of claim is impossible for us to verify,"

Techtel Corp., an Emeryville, Calif., market research firm, released a study last week saying that for the first quarter of 1990, Borland shipped at least one unit of Quattro Pro to as many sites in the U.S. as Lotus did of 1-2-3, Version 2.2. "That is the first time in five years of measuring the market that a competitor has matched Lotus," said Michael Kelly, president of Techtel.

Kelly agreed that the pricing of Quattro Pro may have been the most significant factor effecting its penetration, and it remains to be seen whether it can maintain its position once it returns to sustainable price levels. Techtel had no data on overall market share.

Analysts quickly pointed out that site penetration is not equal

to market share. For the first quarter of 1990, Quattro held about 6% of units sold through dealers in the U.S. market vs. about 26% for Lotus, according to Audits and Surveys, Inc., a New York-based market research firm. "Borland has gained one or two percentage points, but not much more," said Carl Ravitch, senior vice-president. "The Techtel study says that selling one evaluation license to a company is the same as selling 100 platform systems."

Neither International Data Corp. nor Dataquest, Inc., two industry market research firms, could confirm Borland's findings, saying either its Q1 1990 figures were not complete or that they did not track market share in a similar manner.

"There is no question they have been shipping a lot of product," said Nancy McSharry, an analyst at IDC in Framingham, Mass. "But the \$99 promotional price is so low that the buy is painless. People aren't changing platforms, they are simply using the cheap licenses in addition to Lotus and Microsoft."

Mach attack for Intel 386

ANAHEIM, Calif. — Mt. Xinu, Inc., a software development company based in Berkeley, Calif., last week announced that it will provide Mach operating system source code for Intel Corp. 80386-based computer systems.

Dubbed Mach-for-386, the source code is targeted toward the academic research community and commercial developers. According to the company, it is scheduled to be available before

the end of the third quarter and will run on several common ATbus IBM Personal Computers and compatibles, as well as on several Compaq Computer Corp., Intel and Hewlett-Packard Co. platforms.

Mach, a multiprocessing operating system, was developed at Carnegie Mellon University and was designed to provide a foundation for building modern Unix and Unix-like software systems on pew architectures.



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Clone makers slash PC prices

BY ALAN J. RYAN

WESTBORO, Mass. - Leading Edge Products, Inc. and Dell Computer Corp. recently implemented hefty price cuts on their personal computer lines, and Leading Edge began shipping its \$1,995 IBM Micro Channel Architecture-based PC.

Albert Agbay, president and chief executive officer of Leading Edge, said the price reductions are a reflection of pricing trends affecting the entire computer industry. He said manufacturing efficiencies, volume-related component price re-ductions and increased demand for PCs

Leading Edge officials recently traveled to South Korea to meet with parent company Daewoo Telecom President Sung Kyou Park to discuss pricing, according to Bob Henderson, senior vicepresident of marketing at Leading Edge.

"One of the missions of going to South Korea was to give a blow-by-blow of what we could see happening in the U.S. market," Henderson said. "We are designed to be Daewoo's eyes and ears in the U.S."

Joel Kocher, senior vice-president of U.S. sales and support at Dell, said the price cuts at his company - up to \$1,100 were implemented to more competi-

tively position Dell's fully configured products and to enhance the company's commitment to its customers.

The Leading Edge price cuts will affect the D3/MC, an Intel Corp. 80386SXbased, IBM Personal System/2-compatible MCA product, which was originally to be priced at \$2,195 but is now shipping for \$1,995; the D3/25, a 25-MHz, Intel 80386-based desktop unit, which will now cost \$3.995, down from \$4.595; the D3/SX, a 386SX-based system, which will available for \$1,795, down from \$1,995; and the D2/LPS, an Intel 80286based, 12-MHz system, priced at \$1,396, down \$100 from its original price.

The pricing of the company's laptop computers will not be reduced at this time. Henderson said.

Dell's price reductions affect all stanconfigurations of its 286-, 386SX/DX- and Intel I486-based desktop and laptop PCs. The company's Dell System 210, a 286-based, 12-MHz PC, was cut from \$2.549 to \$2.349. The Dell System 310, a 386-based, 20-MHz PC with 4M bytes of random-access memory, a 650M-byte hard drive and IBM Video Graphics Array (VGA)-compatible monitor, had been priced at \$7,599 and was reduced to \$6,499.

Dell's System 425E, which is based on the 486 processor and the 32-bit Extended Industry Standard Architecture bus, was priced at \$9,899 for a 25-MHz model with VGA color monitor and 330M-byte hard drive. The price has been reduced to

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A better look for Super VGA

BY RICHARD PASTORE

A video standards association composed of monitor and video board makers voted earlier this month for a new, higher refresh rate for Super Video Graphics Array (VGA) displays. For users, the manufacturers' resolution could lead to less monitor flicker and eyestrain. For vendors, it could open up more overseas resale opportunities.

A monitor's vertical refresh rate, measured in hertz, is the number of times per second that the monitor redraws the screen image. Currently, the standard re-fresh rates for Super VGA displays are 56Hz or 60Hz.

"The performance levels of 72Hz . . . should lead to reduced eyestrain and tension from prolonged use of a Super VGA board and monitor," said a spokesman at Sigma Designs, Inc., a display maker and member of the 1-year-old Video Electronics Standards Association.

Higher standards in Europe

Europeans are already accustomed to higher refresh-rate displays - most European equipment redraws at frequencies greater than 70Hz. The association's endorsement of a 72Hz standard will enhance equipment compatibility and sales in those countries, according to a Video Electronics Standards Association spokesman.

The group, which held its meeting and voting at Comdex/Spring '90 in Atlanta, also endorsed design guidelines that would keep current 56Hz and 60Hz monitors compatible with the new 72Hz units.

Members of the Video Electronics Standards Association include NEC Technologies, Inc.; Hewlett-Packard Co.; Mitsubishi Electronics, Inc.; Philips Consum-Electronics; JVC Information Products; and Genoa Systems Corp.

IBM's VGA is largely recognized as the de facto standard for personal computer displays. Unit shipments of VGA cards and chip sets totaled 6.8 million last year, according to Framingham, Mass.based International Data Corp. The figure will rise to 9.3 million this year, the re-search company estimated. "Super" VGA is a generic term for higher resolution VGA graphics, typically 800 by 600 When considering new computing technologies, remember the importance of compatibility.

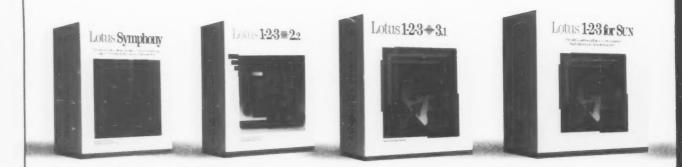
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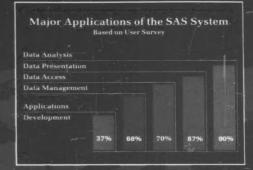


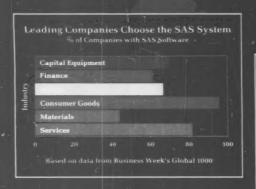
And isn't that what computing is supposed to be all about in the first place?

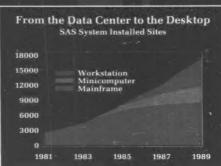
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Downsizing

CONTINUED FROM PAGE 41

for a logistics system that had by then gobbled up 10 years of effort by a team of 10 Air Force Cobol mainframe programmers.

With the help of an IBM 4341 minicomputer with 4M bytes of memory and a fourth-generation language (4GL), Segar was able to complete in six months a major conversion from Cobol to Focus, Information Builders, Inc.'s 4GL. Segar, who runs Infinity Data, a San Antoniobased consulting firm, says he was able to condense 12,000 lines of Cobol code into about 2,000 lines of Focus code.

This is an extreme case, to be sure, but it demonstrates the potential benefits to be gained by prying mainframe programmers off the host and moving them onto smaller machines. According to Ralph Williamson, IBM's manager of Systems Application Architecture (SAA) marketing, the price of an IBM 3090 mainframe runs from \$150,000 to \$200,000 for each million instructions per second (MIPS), whereas on a 4M-byte IBM Personal System/2 Model 70, the cost per MIPS plummets to about \$1,500.

Midnight programmer

Perhaps more typical of PC-based development enthusiasts is Charles Standback, IBM's consulting product administrator for SAA marketing. When he thinks back to life before IBM, Standback says he "vividly" remembers scheduling midnight programming sessions on the mainframe. "We were the low priority, and that was the only time I could get," Standback recalls. Worse, nocturnal work schedules meant costly overtime pay. "PC flexibility allows you to program when it's right for you, not the water-cooled equipment." he says.

Nowadays, mainframe programmers have access to the host during normal working hours, but system overload often leads to unacceptable response time. Other issues of contention include maintenance, project and quality control and the cost of mainframe MIPS — all of which have fueled a budding interest in the comparatively cheap, independent and graphically oriented PC-based programmer workstations.

Downsizing development cycles to programmer workstations has attracted shops such as Rockwell International Corp. in Seal Beach, Calif., which runs all of its applications on mainframes.

To free up space on its IBM 3090 mainframes and cut down on an estimated average IBM TSO cost of \$15,000 per programmer per year, Rockwell is encouraging 2,500 programmers to switch to its homegrown programmer workstation. Initial returns from one test group indicate that programmer costs can be cut back to just under \$8,500 per programmer per year [CW, May 21].

Boeing Computer Services in Seattle estimates that it has halved its TSO costs while encountering productivity gains of 30% to 60% among PC-based mainframe programmers. Virtually all Cobol IMS and some IBM DB2 development and standalone testing is done on a programmer workbench.

"It's paid off heavily, both in relieving use of mainframe resources and in terms of editing, testing and compiling applications," says Joel Massey, a Boeing business systems analyst. Compared with do-

ing the same work on a mainframe, it took less than six months to achieve a payback on the software, he adds.

The plethora of good debugging tools available on PCs is also attractive.

Massey says PC debugging tools "are absolutely 100% better" than mainframe ones — as well as less expensive. Chris Mitchell, a project leader at RFC Intermediaries, a reinsurance brokerage in Atlanta, claims a host-based IBM CICS debugging tool can easily cost \$20,000. "We got Realia Cobol and CICS for \$2,000, and it's a total development environment for the PC," he says.

The options open to programmers looking at PC development range from virtually complete PC-based development that is recompiled on the host to systems that offload front-end design functions and MIPS onto the desktop, leaving code generation to the host. Computer-aided software engineering (CASE) looms large, partly because tools based on that technology first appeared on the PC. IBM Common User Access compliance is mandatory among users who are considering IBM's AD/Cycle cooperative processing architecture that enables users both to tie into the database and share information [CW, June 4]. Windowing-based shells, such as Mozart Systems, Inc.'s Mozart, provide "push-button" programming ease when combined with a layer of CASE tools

Cost and trauma

Of course, there are issues to consider when offloading mainframe applications development to the PC. A big one is the start-up cost. Then there is the trauma facing programmers with 10 or 15 years' experience on the mainframe — who also tend to be older, better paid and have the most seniority.

Products such as IBM's CICS for OS/2 and Caseworks, Inc.'s Caseworks OS/2 Presentation Manager for Cobol can reportedly alleviate culture shock by providing the downsizing programmer with a familiar environment. This is important because frustrated programmers who have a choice have been known to head back to the mainframe ranch at the first sign of trouble. Pride and ego are issues that have to be dealt with.

The sizable investment involved in downloading the development cycle has deterred some mainframe shops. Charles Colpitts, a senior vice-president at The Travelers Corp. in Hartford, Conn., says his shop has looked at programmer workbenches, but he needs to be "100% sure" that the PC-developed code will run the same on the mainframe as it did on the PC.

Many of the packages needed to accomplish the switch first came on the market with hefty price tags. For example, some development environments alone have run as high as \$2,000 per desktop. Rockwell's Programmer Workstation package initially cost \$20,000 per workstation, but the company has since gotten the cost down to just under \$10,000. One hidden cost is the inevitable move to a network, many users caution.

Steven Goldberg, director of engineering at Monarch Marking Systems, Inc., a maker of bar-code readers in Dayton, Ohio, concedes that it is hard to prove raw dollar savings, adding that he suspects there are more "soft" savings to be had, particularly on a network. Users say these include better designed software, easier code reviews and time savings throughout the stages of development.

PC industry

CONTINUED FROM PAGE 41

Who would have thought in 1981 that the PC business would have to resort to such a rehearsed stage show to sell the future? Time was, a kid crawled blinking out of the dim light of a garage and charmed the world. Last month, even three million dollars' worth of lights and kitsch left users and analysts yawning.

The PC business used to be about cutting-edge technology. Today, people see it as a brand management business that hinges not on blowing people away with function, but rather on creating perceptions about the market positioning of products.

The industry has reached a point at which people will line up around the block, as they did in San Francisco, to get into a product introduction. Windows 3.0 is recognized as a strong product. After all this time, DOS has finally caught up with the Apple Computer, Inc. Macintosh. Despite the strengths of the product, users and ana-

lysts may have overreacted. Closer examination of Windows 3.0 indicated that Microsoft has not reinvented DOS.

Ten years ago, it was not necessary to convince people that they needed the latest advance in technology. They were already salivating at the prospect of a desk-

top computer that packed a bigger punch than an 8K-byte memory.

Today, users have put the brakes on purchasing the most advanced system for the sake of it. Many said they believe they are technologically saturated and insist on proven business functionality before they spend. Users said they do not need another project manager or automated date book. No longer driven to buy, they now must be convinced that they need new bells and whistles.

Today, even Microsoft resorts to press briefings designed to correct "misconceptions" about strategic relationships, market targets and product capabilities. The industry is in an era of "goalspeak," long a

staple of IBM in the

mainframe world. This is seen as Microsoft's way of indicating it is committed to achieving a certain design goal, but critics note that Microsoft will not commit to delivery or a specific date — or even, in some cases, to what the technology will look like.

WHY THE MANN 1990 CENSUS OF IS COUNTING & ON VIKING ON THE PARTY OF TH

When the U.S. Census is taken in 1990, data will be key-entered with Viking software. About 106 million households will be asked as many as 60 questions per person. Viking Data Entry (VDE) system will be used to record responses. VDE software was selected because it is...

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Daly

CONTINUED FROM PAGE 41

of every stripe.

But no matter how hard she squints, there is one object she says she's never been able to see on the horizon: decent support for the more than 10,000 Macintosh systems she has control over.

"Apple has a lot to learn about providing support for the MIS community," Arledge says disconsolately. "The Mac is not a toy anymore but a critical part of our business environment. We can't afford for it to be [down]." Instead, Arledge relies on a squad of homegrown technicians who can tear open a Mac with the ease that some people shuck oysters. It works, sure, but it's like telling the guy who buys a fleet of BMWs that he can kick around under the hood each time he hears a knock or ping.

While price/performance comparisons were the battle cry of the 1980s, users are rethinking their priorities. The 1990s promise to be the age when support services achieve paramount importance. Users are becoming more demanding, and the strength of the warranty is now nearly as important a consideration as the hardware's capability.

To be fair, Apple has taken some tottering steps toward beefing up its heretofore skimpy support offerings. It has extended its original product warranty from 90 days to one year and hooked up with third-party service providers such as KPMG Peat Marwick and EDS to handle integration and management services.

However, even Apple insiders confess they have only taken but the first steps in a long journey. "Today's corporate use clearly goes beyond the service and support we can offer today," says Morris Taradalsky, vice-president of customer support products and services.

Apple is not alone in this neglect. Service problems are so endemic to the industry that users have learned to become more self-reliant. According to a study by The Ledgeway Group, more than 40% of the desktop users surveyed saw themselves as the primary provider of services for their workstation software, network support and training needs. I'll wager that, if given the choice,

most users would like to have their hardware and software support services performed by the equipment manufacturer.

Director of Apple Integrated Services James O'Gara says that Apple has been working on the problem. According to O'Gara, the firm is considering a variety of contract and subscriber services ranging from custom application development to a SWAT team that dashes out when your system goes down. But those efforts are still pilot programs, he says.

That's an awfully long time to someone thinking about purchasing Macs today. But O'Gara says it's all part of the process. "It's not a question of not doing it," he says. "It's just a question of when we'll work out the kinks."

While the ball is still in the air, Apple may also want to consider other options. Some vendors have moved to restruc-

PPLE HAS a lot to learn about providing support for the MIS community."

KIM ARLEDGE UNIVERSITY OF TEXAS

ture their service pricing through discounting and packaging of services, rather than charging fixed maintenance fees. The most active area has been in bundled support. Turnkey packages are more common and often include such extras as training and installation.

tras as training and installation.
So if your Mac is acting up, hang in there. The Apple service/support cavalry is on the way. And, as my grandmother used to say, there isn't an electronic product on the market that doesn't benefit from a good swift kick now and then.

Daly is a Computerworld West Coast senior correspondent.

MCA-based PCs get Freestyle

LOWELL, Mass. — Wang Laboratories, Inc. recently released a new version of the Freestyle personal computing system designed for IBM Micro Channel Architecture (MCA)-based personal computers running Microsoft Corp. Windows 2.10.

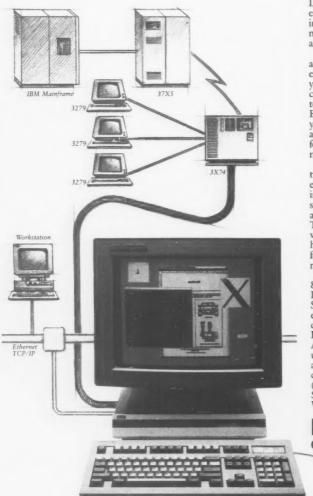
According to the company, the latest version allows users to choose the Free-style pencil, instead of a mouse, as a pointing device in the Windows environment.

The product provides MCA-based PC users with Freestyle handwriting annotation, electronic mail and graphical desktop management capabilities. Facsimile functions are also available.

Wang is researching a Windows 3.0-compliant version of Freestyle, a company spokeswoman said, but specific product information is not yet available.

The latest release updates both the Freestyle/Light software package and the standard Freestyle system, a combination hardware and software platform that includes the electronic tablet, pencil and icon-based PC software. The core package, including the interface card and cable, costs \$995 and is available for immediate delivery.

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LanSet 800. A new X Window equation. To give you full integration of X Windows and mainframe 3270 connectivity in a single X server.

LanSet 800 has several ways of adding 3270 functionality to X. For example, LanSet 800/3270dc gives you both an Ethernet TCP/IP connection and direct connection to an IBM 3X74 controller. Use the Ethernet connection for access to all your X Window and other UNIX applications. Use the IBM connection for direct access to your SNA network and SNA applications.

network and SNA applications. With the LanSet 800/3270dc, two cables—Ethernet and your existing 3X74 coax—plug directly into the LanSet X server. On the screen you have a 3270 window and as many X windows as you like. The 3270 window is fully integrated with the X environment, with no hot key required. There's no need for any special software on your mainframe.

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Keyboards

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It's only fair to warn you that exposure to new Microsoft Windows version 3.0 has been linked to obsessive and habitual usage. Why?

Because with a simple click of the mouse users can connect to the network, even access and manage network resources. All without cumbersome keyboard commands.

Which means users are now able to share data. Not frustration.

While in the interest of time, the Windows 3.0 graphical user interface

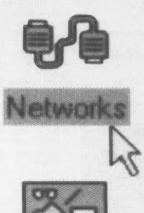
was designed to be easy to learn. And use. Neophytes, not to mention troglodytes, will be up and running in no time. With virtually no training.

Mensylt Warray

Now, 286/386™ machines running MS-DOS will no longer be limited to 640K. So there are no more impediments.

Users can even en-

joy a network connection and at the very same time satisfy the cravings of multiple applications.



Desktop



Ports



Fonts

a point and click hooked.

And since Windows 3.0 has a modular setup program, a single copy now memorizes every user configuration on the network. Which means, so to speak, one size fits all.

Furthermore, Windows 3.0 has redefined its relationship with IBM° 3270 emulation programs. Users can now download corporate data and easily share it with Windows applications. Something we have come to call peaceful coexistence.

One last point. Because Windows

3.0 has been optimized for machines with 1-2 megabytes of RAM, it will go a long way towards protecting your hardware investment.

Call (800) 323-3577, Department L21, for a backgrounder that outlines how Microsoft Windows 3.0 could benefit your corporation.

We're certain that you'll agree it's a habit well worth forming.

Microsoft
Making it all make sense

NEW PRODUCTS

Board-level devices

Ariel Corp. has announced a plug-in card designed for IBM Personal Computer ATs and compatibles.

The MM-96 board is based on Motorola, Inc.'s 96002 Media Engine and operates at 100 million floating-point calculations per second. It functions as a development platform or an application daughter card and handles algorithms that demand deterministic or real-time results, the vendor said.

A basic configuration, which includes one 96002 engine and 1M byte of memory, sells for \$3,995. Versions that include dual 96002 engines start at \$5,995. Ariel

433 River Road Highland Park, N.J. 08904 201-249-2900

Matrox Electronic Systems Ltd. has announced a parallel processor board designed for personal computers based on Extended Industry Standard Architecture.

The MP-860 board can be configured with 2M to 20M bytes of memory. As many as eight boards can be interconnected via a message-passing bus to form a

parallel processing platform that can provide 640 million floating-point operations per second and 320 million instructions per second, the vendor said.

The price of an MP-860 configured with 2M bytes of random-access memory is \$6,300. The board is scheduled for release in the third quarter.

Matrox

1055 St. Regis Blvd. Dorval, Quebec, Canada H9P 2T4 514-685-2630

Unix software

Apparel Business Systems, Inc. has announced a Unix version of its business management software system designed for use on IBM Personal System/2s and

RISC System/6000 workstations.

The ABS software package covers all facets of accounting, financial management, order entry, control and component and finished goods inventory, according to the vendor.

The list price of hardware and software for the ABS Unix-based system starts at \$25,000. The price of a hardware and software installation for an IBM Application System/400 begins at \$60,000. A 24-user RS/6000 configuration costs \$66,500.

Apparel Business Systems Lee Park Conshohocken, Pa. 19428 215-940-0880

Peripherals

A line of dot matrix printers designed for personal computer and desktop applications has been announced by C-Tech Electronics. Inc.

The products include the nine-pin Prowriter C-240 and wide-carriage Prowriter C-245, both of which are equipped with a 19.25K-byte buffer that enables multiple-page documents to be printed without jamming; the 24-pin Prowriter C-510, and wide-carriage C-515, both of which include a 14-page, 28K-byte buffer; the Prowriter C-610+; and a 28-pin Prowriter C-645, which features a 32K-byte buffer that can store up to 18½ pages of text.

Pricing ranges from \$449 to \$1,395,

depending on model. C-Tech 2515 Mc Cabe Way Irvine, Calif. 92714 714-833-1165

Software utilities

Personics Corp. has begun shipping an add-on product for Lotus Development Corp.'s 1-2-3.

Instant Analyst offers a Smart Colors feature that can be used to highlight parts of a spreadsheet according to user-defined criteria. Common applications include displaying negative values in red, highlighting cells with values below a certain threshold and comparing sales expense figures against quotas or budgets.

The product is available for a suggested retail price of \$69.95.

Personics 63 Great Road Maynard, Mass. 01754 508-897-1575

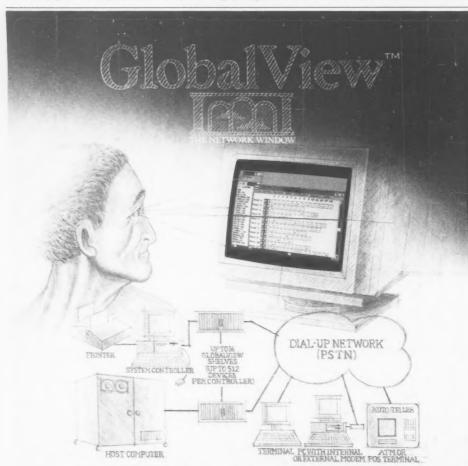
Software applications packages

Computervision has announced that its Personal Designer Revision 4.0 mechanical design software package is now available on Sun Microsystems, Inc. Sparcstation 1 workstations.

The product includes a multiple view capability, which enables users to create up to 30 views of a part and maintain an association with all views; a model mode/draw mode, which allows users to enter text and geometry as three- or two-dimensional drawing entities; and the ability to run in a multiwindow environment.

Personal Designer 4.0 costs \$2,800 or \$5,800, depending on the type of software package.

Computervision 100 Crosby Drive Bedford, Mass. 01730 617-275-1800



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NETWORKING

DATA STREAM Ellis Booker

Cold War redux



Just when you thought the Cold War had been transformed into a tropical lovefest, with Presidents Gorba-

chev and Bush joshing and playing horseshoes on the South Lawn, the scene is doused by an ice bath of "national security concerns.

Two weeks ago, the U.S. Department of Commerce, citing national security issues. blocked US West's plan to construct a fiber-optic communications cable across the Soviet heartland. True, the decision was not a total surprise. At 565M bit/sec., the proposed transmission system, while less than half the speed of state-ofthe-art systems, is still far in excess of the 140M bit/sec. ceiling maintained by the State Department.

It's certainly appropriate that export controls be maintained on countries that might use our products - be they wood chips, supercomputers or telecommunications networks to the detriment of ourselves or our allies.

But in this instance, the reasons seem forced. At a time when the computers that can be flown to the Soviet Union are getting more and more powerful, ongoing restrictions on the networking gear is a subtle way to hobble these systems. It's like selling a Ferrari but making sure that the only available high-

Continued on page 60

LAN backup made easy

Networker puts file search ability in users' hands

BY ELISABETH HORWITT

PALO ALTO, Calif. - A software tool introduced last week by Legato Systems, Inc. is said to relieve network administrators of most of the burden associated with backing up files across corporatewide networks of Sun Microsystems, Inc. systems.

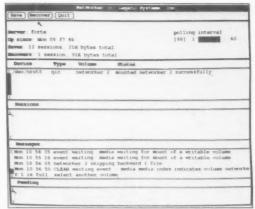
While a number of currently available products "make backup easy and fast, when it comes time to get the file back, it often takes a skilled administrator to wade through all the tapes and records and find it," Legato Vice-President of Engineering Robert Lyon said.

Networker Release 1.0 addresses this problem by making an on-line index of every file backed up, so that the "user who lost the file in the first place and is most capable of saying which one he wants can do the actual search," Lyon said. The administrator gets involved only after the search is done and the correct tape is identified, he added.

Networker may well be the only "legitimate Unix network backup product that takes advantage of characteristics inherent" in a client/server model, as well as Sun's Remote Procedure Call technology, according to Dan Kolkowitz, manager of Unix and network service development for Stanford University's Academic Computing department. As a result, "users anywhere on the network can access resource modules" that perform tasks such as backup, file indexing and status monitoring. Kolkowitz said.

One crucial feature, according to Kolkowitz, is Networker's multithreading capability, which allows multiple clients "to be backing up to the same tape at the same time.

The traditional sequential method of backing up one disk at a time requires "that someone be there" to set up the next job as soon as the previous one is done, Kolkowitz said. With Networker, however, "vou don't have to worry about coor-



Networker 1.0 makes an on-line index of every file backed up

dinating times, so you can launch [multiple disk backups] at the same time."

Networker can also back up a set of disks much faster than traditional products, because it does not have to wait for data from a particular disk but can access whichever I/O port has data ready, Lyon said. The system also crosses over automatically to another tape when the previous one is full, Lyon said.

The software can be programmed to automatically back up files at intervals of one day or longer, across multiple localarea networks, Lyon said.

Networker also features a windows-based status monitor that is said to notify the operator of pending work as well as potential problems, such as a disk I/O error or a file changing during the backup process, according to

Fast packets

By the end of 1991, Martin Marietta will be using fast-packet switches at three metropolitan-area network hubs



Opting for fast-packet tech

ONSITE

BY MITCH BETTS

CHANTILLY, Va. - Sure, a company with at least 500 localarea networks scattered across the country could continue to string dedicated T1 circuits among them. But that wouldn't really be managing the corporate network efficiently.

So Martin Marietta Corp., the big defense contractor with 65,000 employees, has decided to become one of the early adopters of fast-packet multiplexer technology to help it do a better job of managing large, bursty file transfers such as LAN-to-LAN connections.

"We'll be able to slow down the growth of T1 lines and utilize what we have much more effi-ciently," explained Duane Heidel, director of corporate communications networks.

Martin Marietta's information systems group plans to begin deploying fast-packet switches for data traffic in mid-1991, according to Jerry Tieszen, director of corporate communications architecture. He said it is

Continued on page 61



When you compare today's high-performance printers, CIE America's CI-5000 and CI-1000 always top the charts. Because each has the lowest price-to-speed ratio of any printer in its class. And a host of can't-beat-em incentives that make

these printers the obvious choice

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Making reservations can be a breeze

Cruiseship's new cooperative processing reservation system could ensure smooth sailing

ONSITE

BY ELISABETH HORWITT

MIAMI — A travel reservation company is implementing some of the very latest IBM peer-to-peer Systems Network Architecture (SNA) features and services as a way to provide its travel agents with cost-effective, on-line access to up-to-the-minute information on Caribbean

Cruise bookings.

Cruiseship Information Systems, Inc. plans to release a DOS-based cruise reservation system in the fourth quarter that runs in a cooperative processing environment, said Brad Carter, the travel company's vice-president of operations.

Cruiseship provides electronic cruise booking services for Royal Caribbean Cruises, Inc., which recently purchased

he company.

Agents will be equipped with either an IBM Personal System/2 Model 50 or a machine of equivalent power. "The software is in C, so it is pretty hardware-independent," Carter said.

The workstations will also be equipped with enough disk space to handle "a significant database" of information about Royal Caribbean products — the type of information that does not change often, such as departure schedules and itineraries, Carter added.

With this information at their fingertips, agents will be able to use Cruise-

ship's DOS-based reservation software package, Cruisematch, right at their desktops to process a large portion of customers' cruise arrangements and answer questions.

On-line connections to Cruiseship's and Royal Caribbean's IBM Application System/400 hosts will be pretty much limited to accessing volatile information, such as cabin availability on particular cruises, and making the actual bookings and confirmations. Carter said.

Whenever an agent signs on, the system checks to see if it needs to update the agent's files with new infor-

mation.

If so, it automatically goes into batch mode and sends the updates down. If not, the two systems go right into an interactive session for making an

actual reservation, Carter said.

During this transaction, Cruiseship's AS/400 acts as a liaison between the agent's FS/2 and Royal Caribbean's system, passing customer requests for a certain cabin class up to Royal Caribbean's host and passing down availability data, for example.

Once a reservation is confirmed, the agent does some local processing on the personal computer, "collecting names, citizenship, dining preferences — the guts of the cruise reservation," Carter said.

The agent then edits the reservation and passes the finished product back up to Cruiseship's system, which makes sure it is all in order and passes it on to Royal Ca-

ribbean's host, which in turn "confirms and prices it out," Carter said.

Confirmation numbers are sent back to Cruiseship, which sends them down to the

ware Associates, Inc. and Spectrum Concepts, Inc. The firm said it hopes to begin implementing the software and PS/2 workstations on agents' sites in the fourth quarter.

IBM Information Network will act "solely as a go-between," routing calls from various agents and Cruiseship over its SNA network backbone, Carter said. Royal Caribbean and Cruiseship hosts will

NCE A RESERVATION is confirmed, the agent does some local processing on the personal computer, "collecting names, citizenship, dining preferences—the guts of the cruise reservation."

BRAD CARTER CRUISESHIP

agent as a finished package.

The whole three-way interaction rides on top of IBM's PU2.1 and LU6.2 protocols, which enable workstations to communicate as peers over an SNA network—in this case, IBM Information Network's service.

Cruiseship had considered setting up a classic SNA-type network for its agents; however, peer-to-peer LU6.2-based networking won out primarily because it minimizes the need for on-line connections between the different parties.

Combining this with dial-up links to IBM Information Network's service, which only charges according to usage, should mean significant line cost savings for Cruiseship and its agents — particularly given the volume that the travel service expects to see over such connections, Carter said.

Cruiseship programmers developed the reservation application to run on top of LU6.2 software from Network Soft-

communicate over dedicated lines, he added.

Security is one major issue that became more difficult to cope with because of Cruiseship's decision to go with a peerto-peer network. "There is nothing IBM can do for you in a peer-to-peer environment because they're not running [user queries] through their mainframe," Carter said

The travel firm's programmers have addressed this problem by developing a security system that includes user identification and password protection, Carter said

A chip attached to each agent's PC is accessed by Cruiseship's application programs "so that it's all encrypted when it comes to us," Carter said.

Users' queries contain embedded security information that the IBM network node passes on to the travel company, "and if it's not there, we terminate the session." he added.

GEIS eyes hospitality market

BY JIM NASH

Hotel chains are growing disappointed with their reservation systems — disappointed enough to outsource the heart of their systems. At least, that is the hope of General Electric Information Services (GEIS).

GEIS, a division of General Electric Co., recently began marketing its own hotel reservation service.

Called Manor System, the service provides support and software linking IBM or compatible personal computers in each of a chain's hotels to GEIS' mainframes in Rockville, Md.

Golden Tulip, an Amsterdam-based hotel chain of about 225 buildings in almost 60 nations, is the only business currently using the system, said Mike Bradley, hotel industry market executive at GEIS.

A capable manner

Bradley said that Manor includes software for IBM 3270 emulation, hotelchain reservation operations and individual hotel operations. It also provides gateways between hotels and airline reservation systems such as American Airlines' Sabre.

Bradley explained that 80% of the processing done with each reservation on Manor will be completed on the PCs. The

mainframes, he said, store total room availability and price records. Using X.25 links, each PC receives an update of this information each night.

The same links allow the mainframes to be updated each time a reservation is confirmed by a chain's telephone reservation operation, an individual hotel's reservation desk or a travel agent.

Manor, Bradley explained, is being marketed modularly, allowing hotels to mix and match options that they require. One option offers full-color hotel representations that can be called up on a screen.

Ready for change

Bradley said a CEIS survey of 25 U.S. and European hotel companies revealed that many large chains are ready to rid themselves of their own centralized reservation systems. He claimed that hotel executives believe their systems are currently inadequate to handle the number of transactions processed

Executives reportedly said they feel that "a substantial overhaul of their system will be necessary in the next one to five years," according to Bradley.

He declined to reveal how much the service would cost, saying that prices would vary depending on a chain's size and the options requested. The hotels surveyed were spending between \$3 and \$10 per reservation, Bradley said.

Booker

CONTINUED FROM PAGE 59

ways are made of dirt and strewn with

Briefs justifying the Commerce Department decision were circulating in Washington, D.C., last week. Many discussed the alleged "survivability" of fiber optics in the face of a nuclear attack. Yet an argument can be made that "survivable" communications for an enemy are, in fact, desirable. Without communications, how can the enemy surrender? Or, as the movie By Dawn's Early Light illustrated, how can countries avoid an accidental spiral into all-out warfare if leaders on one side cannot communicate with their own forces, let alone the enemy?

Moreover, worries that security safeguards proposed by US West and its European and Japanese partners on the project would be insufficient to prevent a 'diversion' of this \$500 million civilian system to Soviet military applications do not bear up under analysis.

A US West spokesman put it best when he said he strongly doubted Soviet military planners would want to use a fiber system "designed, constructed and supervised by Western countries." US West has said it will seek a Commerce Department review of the decision — an effort that isn't given much hope for success. A day after the US West ruling, the 16 other member countries of the Coordinating Committee on Multilateral Ex-

port Controls (Cocom) agreed with the U.S. to hold all fiber exports to the 140M bit/sec. level. The U.S. said it was confident it could prevent non-Cocom countries from providing the technology and snatching the Soviet contract.

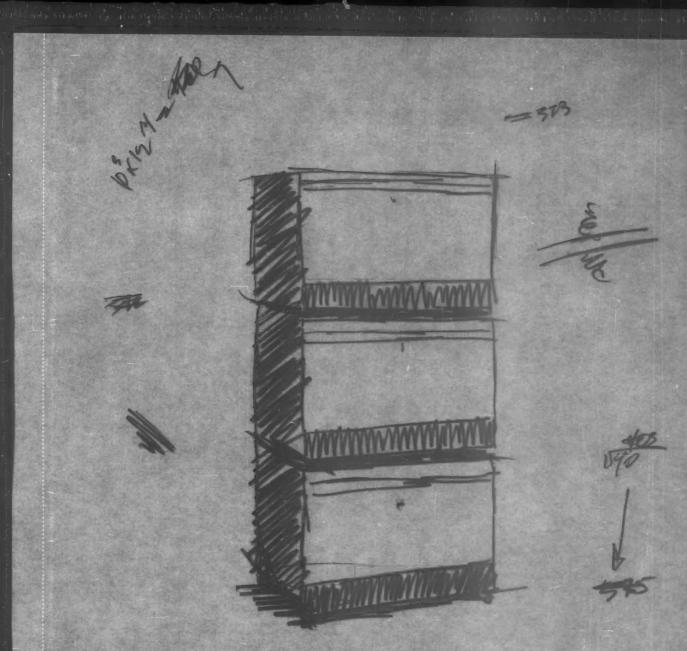
The real reason the trans-Soviet fiber line plan was kiboshed, according to Washington, D.C. insiders, was that it would have made the job of high-tech eavesdropping more difficult.

However, the Bush administration could not play up this principal objection, since this would mean first admitting to our eavesdropping activities (as if that would come as a surprise to anybody), and second, implying that we fundamentally do not trust our newfound Soviet friends, which sounds too Reaganesque and old-fashioned.

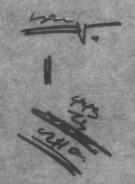
It's worth recalling that liberalized export policies serve a higher objective than improved commerce: They seek to upgrade the basic infrastructure and economies of these nations. Such policies have at their foundation the belief that access to Western know-how will make Eastern Bloc countries more prosperous, more politically stable and, ultimately, more attractive as potential markets for Western commerce.

That's still sound reasoning. And it should guide the Commerce Department's review of its decision on the trans-Soviet fiber case.

Booker is Computerworld's Chicago correspondent.

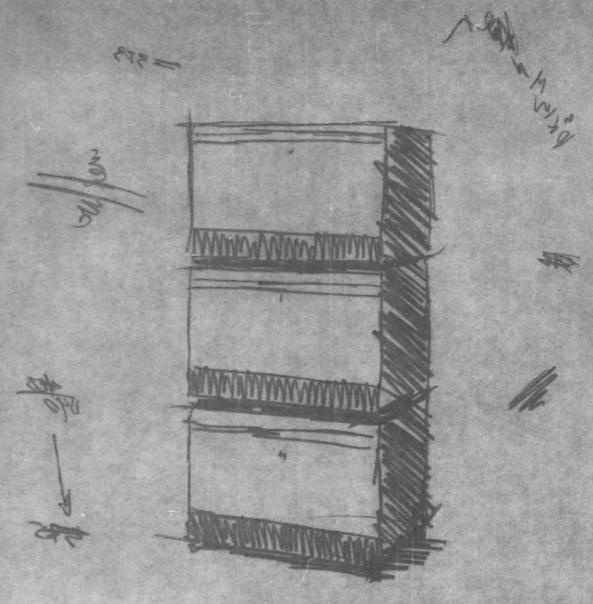


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AT&T designers built critical ISDN technology Toe modular DEFINITY
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The right choice.

Gigabit net gets \$15M in funds

BY GARY H. ANTHES

WASHINGTON, D.C. — In what may be an unprecedented cooperative effort by industry, government and academia, last week, \$15 million in seed money was allocated to research on a nationwide fiber-optic network operating at speeds above 1G bit/sec., hundreds of times faster than the quickest networks in common use today.

The National Science Foundation (NSF) and the Pentagon's Defense Advanced Research Projects Agency are contributing \$15.8 million in seed money to the project, with many times that amount coming from computer and communications companies that will provide research personnel, computer and communications technology and fiber-optic transmission capacity.

The project's primary goal is not immediate deployment but to "get research started in the technologies needed to get a multigigabit/sec. national network going," and also to make possible planned upgrades to current high-speed backbones such as the NSF's NSFnet, according to Alan Baratz, IBM department group manager, communications and concurrent sys-

tems. The current project is "parallel and complementary to" Sen. Albert Gore's (D-Tenn.) recent efforts to obtain federal funding for the high-speed National Research and Education Network project, Baratz said.

The target user population for the high-speed backbone is

for the high-speed backbone scientists and researchers in the academic, military and commercial sectors, who would use the multigigabit bandwidth to collaborate more effectively with one another and with computer resources around the country.

While no implementation blueprint exists, it is possible that the network could replace the domestic portion of the existing Internet, the umbrella network of research networks. Although the federal government would fund much of its development, its sponsors said it would eventually be turned over to the private sector for commercial

The project, which is being managed by the Reston, Va.-based Corporation for National Research Initiatives (NRI), will establish five test networks for

research in wide-area, highspeed data communications. According to Robert E. Kahn, NRI president, the experimental nets will be used to evaluate alternate network architectures, protocols, experimental switching and transmission techniques, interfaces, operating systems and user programming languages.

Network technologies will be evaluated for performance, reliability, scalability and cost, he said.

The project will test different architectures' ability to support a variety of applications, includ-

ing weather modeling, remote medical imaging and teleconferencing. It will also seek ways to distribute single applications across multiple remote supercomputers and to support multisite research collaboration on wide-area networks.

The project will also look at network management, billing, privacy and other nontechnical

MCI Communications Corp. will provide a data transmission hub for two of the test nets, said Ned Farinholt, an executive staff member of advanced technologies at MCI. The company will

provide long-distance communications over fiber-optic pipes with a capacity of 2.4G bit/sec. In the Southwest, MCI will connect to the local exchange carriers of US West and Pacific Telesis via the Synchronous Optical Network (Sonet) interface definition, which will then provide data to local users at whatever speed they can handle. For example, data will go to the Jet Propulsion Laboratory at the California Institute of Technology at 800M bit/sec., Parinholt said.

At the other end of the country, MCI will work with Bell Atlantic Corp. and Nynex Corp. to set up a regional backbone with end points in Boston and Philadelphia. Based on Sonet technology, the backbone will support multimedia communications among IBM, Bell Communications Research, MIT and University of Pennsylvania sites, Baratz said.

These experimental widearea networks anticipate future commercial service, said Walter Johnston, director of the Prototype Services Laboratory at Nynex. "They would form a public network reference model for future broadband services."

In another experiment, AT&T will upgrade its Xunet test net from 1.5M bit/sec. to 45M bit/sec, with future plans for combining multiple 45M bit/ sec. channels into 600M bit/sec. links.

MFS lands Pittsburgh

Systems, Inc. fiber-optic-based network services have been vying with local carriers in major cities across the country, recently initiated service on 855 fiber miles in Pittsburgh business districts and announced the network's first customer: William M. Mercer, Inc. MFS already has networks operational in eight other cities and plans to open net-works in New York and Dallas later this year.

Newbridge Networks, Inc. recently signed a contract to provide equipment for CBS' nationwide backbone network. Newbridge's 3600 Main Street T1 Bandwidth Managers will route traffic between CBS' New York headquarters and broadcast center with broadcast centers in Washington, D.C. and Los Angeles and a corporate data center in New Jersey. The installation's second phase will link the larger CBS-owned and operated stations across the U.S.

Western Union Corp. and Electronic Data Systems Corp. (EDS) have signed a new 10-year agreement under which EDS will furnish management and financial applications systems expertise to Western Union, in addition to redesigning the network service company's information systems over the next two years. The agreement, which is valued at approximately \$250 million over the 10-year term, replaces an agree ment signed by the two companies in 1985.

New tools through Windows

BY JIM NASH

The current flood of products being updated for Microsoft Corp.'s Windows Version 3.0 by network vendors should act to prime the pump for genuinely new network products tied to Windows, according to industry observers.

Analysts that were prodded to list new — rather than merely updated — local-area network products announced in relation to Windows 3.0 software came up empty. That, however, did not negatively color their impression of the graphical interface as a viable network component.

The increased ease of use and the ability to engage multiple applications offered by Windows will spawn new products, said Nina Burns, principal at Network Management Solutions in Menlo Park, Calif.

Ernst & Young consultant David Passmore said he expects "RAM cram" to subside, especially in the micro-to-mainframe setting, as Windows-specific products emerge. The memory-juggling capabilities of Windows will make it possible, for example, for Microsoft MS-DOS-based personal computers to support LU6.2 and PU2.1 proto-

cols that enable them to communicate directly with a host as peers, rather than through a terminal-emulation gateway, he added.

Enabling systems to run IBM's Systems Network Architecture sessions "end to end," or from the host to the micro, Passmore said, will boost throughput and improve system fault isolation. Currently, hosts cannot see past gateways to detect problems with individual workstations. he explained.

Today, however, vendors are primarily announcing Windows 3.0 support for their existing communications products. Wall Data, Inc. in Redmond, Wash., for example, has done so for its micro-to-mainframe link, Rumba, which is said to take advantage of the Windows Dynamic Data Exchange feature. This enables users to set up interactive links between host sessions on different windows, so that changes in one window dynamically update the other, Wall Data said

Consumer Software, Inc. in Vancouver, British Columbia, is shipping a new version of its Network Courier software that takes advantage of freed memory to allow users to send electronic mail and perform other tasks simultaneously.

Fast-packet

FROM PAGE 5

not clear whether it will be used for voice traffic as well.

Steven A. Taylor, president of Distributed Networking Associates, a consulting firm in Greensboro, N.C., said it appears that Martin Marietta will be one of the leading-edge users of fast-packet technology. "They will have many vendors to choose from in the next 12 to 18 months, because a flurry of product announcements is expected in that period," he added.

The technology combines fast-packet switching — "fast" because it eliminates error correction at intermediate nodes and has an abbreviated header — with frame relay, an emerging standard interface that the company will use to optimize bandwidth when linking LANs across the country.

A dedicated circuit is not efficiently used by bursty traffic, but fast-packet/frame-relay technology has an activity-detection feature ensuring that bandwidth is used only when needed. This ability to provide bandwidth on demand is especially attractive to Martin Marietta.

Heidel said that data traffic at the company is growing dramatically, with ever greater demands from such "bandwidth hogs" as file transfers between LANs and between engineering workstations.

Moreover, the bandwidth sometimes is needed on very short notice. "Martin Marietta may move 200 to 300 people into a building overnight to start a big project, so bandwidth can't wait 60 or 90 days. It has to be there." Heidel said.

The fast-packet technology is one element of a network architecture that Martin Marietta will be deploying in phases over the next five years. Eventually, T1 transmissions from one metropolitan area will be routed to a hub with fast-packet switches and then passed to another metropolitan hub via interstate carriers' T3 services.

In essence, the workstationto-workstation architecture will correspond to the company's move away from the old "mainframe mentality" to distributed data processing, Tieszen said.

Tieszen said that, during the next five years, the company will migrate from its 15-year-old IBM host-to-terminal network to a new Hybrid Network Architecture that emphasizes LAN-to-LAN connections. Besides fast-packet switches, the company's Hybrid Network Architecture has the following features:

 A private X.25 subnetwork will be used, beginning in 1991, for electronic mail and electronic data interchange.

• The company will be selecting

a standard set of bridges and routers for LAN-to-LAN connectivity later this year, for deployment in 1991.

 A high-speed channel will be implemented for niche applications, such as computer-aided design and manufacturing.

Tieszen said fast-packet/ frame-relay "should be valid technology through the late 1990s. However, the asynchronous transfer mode of broadband Integrated Services Digital Network will come along sometime around 1995 and possibly replace that."

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When you aren't using NEC's PowerMate SX Plus, you might want to put it into a display case. This small-footprint machine, priced at [\$2,399]* in a minimal no-hard-disk configuration, is one of the most precisely built and luxuriously finished computers that ever graced a test bench in PC Labs.

The elegant surface-mount technology of its motherboard; the complex interlocking design of the dedicated boards bearing the CPU, floppy disk drive controller, and optional high-

speed memory; and the exact The PowerMate SX Plus detailing and finish on all its parts make this a computer to admire as well as to use. Even the enhanced-style keyboard, with its light but clicky feel, is a contender for the title of best keyboard.

It isn't cheap, but it's one of the few computers that may

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NEW PRODUCTS

Protocol converters

At Dexpo East in Boston next week, Hewlett-Packard Co. will unveil its HP 18226A International Standards Organization protocol interpreter, designed for use with the HP 4972A local-area network protocol analyzer.

The product enables managers of multivendor Ethernet LANs to test systems and applications prior to network installation or to troubleshoot interoperability and efficiency problems on existing networks. It can reportedly decode protocols through the Session Layer of the Open Systems Interconnect reference

The HP 18226A costs \$950. The HP 4972A LAN protocol analyzer sells for

\$18,350.

19310 Pruneridge Ave. Cupertino, Calif. 95014 800-752-0900

Micro-to-micro

Softklone has announced Takeover, a personal computer remote-control software package that enables users to access and take over a remote PC.

The product's dialing directory interface includes pull-down menus with keyboard and mouse control. It is equipped

Softkione's Takeover features pull-

with 51/4- and 31/2-in. disk sets and requires IBM PCs or compatibles running MS-DOS 2.0 or higher.

The list price for software for the host and guest PCs is \$295.

327 Office Plaza Drive Tallahassee, Fla. 32501 904-878-8564

Electronic mail

AT&T and Voicecom Systems, Inc. have developed a network-based voice messaging service.

AT&T Voice Mail enables users to create, process and receive voice messages nationwide at any time of day, seven days a week. The service includes an 800 number that customers can dial to leave messages or place orders and a 24-hour

A one-year contract costs \$9 to \$12 per mailbox, plus usage and 800-line charges. Customers who purchase more than 50 mailboxes will not have to pay mailbox or usage charges for 90 days, according to the vendor.

Clients who switch from competitive services will have installation charges waived. Both offers expire June 30.

55 Corporate Drive Bridgewater, N.J. 08807 201-658-6000

Western Union Corp. has announced an integrated electronic messaging program that allows users of Digital Equipment Corp. VAX systems to send documents directly from the systems on which they were made.

Office Access links users of DEC VAX and Microvax systems with Western Union's worldwide electronic mail services. It supports public messages and private directories within VMS Mail and operates with DEC's All-In-One, the vendor

A license fee for Office Access costs between \$2,000 and \$10,000, depending on the type of DEC system used.

Western Union One Lake St. Upper Saddle River, N.J. 07458 201-818-5000

At Dexpo East in Boston next week, Netcor, Inc. will announce a local-area network interconnection device that provides a repeater interconnection between standard Ethernet (10 Base5) coaxial segments and thin Ethernet (10 Base2) coaxial segments.

The NC-208 10-segment local Ethernet repeater complies with the Ethernet V2/IEEE 802.3 repeater specifications for carrier sense multiple access with collision detection 10M bit/sec. operation.

The product lists for \$2,495 and is available 60 days after receipt of order, according to the vendor.

Netcor

850 Auburn Court Fremont, Calif. 94538 415-623-3700

Simpact Associates, Inc. has announced a line of X.25 connectivity products available for VAXBI bus, Digital Equipment Corp. Q-bus and Motorola, Inc. VMEbus

Continued on page 66

To find out how easy it is to convert DCA's new IRMA from standard to MCA bus, flip the page.



Continued from page 65

The CPI 2101 and VCI 2000 series implement all CCITT X.25 specifications.

The CPI 2101 is available for VAXBI bus and Q-bus systems running under DEC VAX/VMS, Ultrix and AT&T Unix System V operating systems. The VCI 2000 is available for VMEbus systems running under Unix System V, University of California at Berkeley Unix 4.2 and Vxworks operating systems.

Pricing for the CPI 2101 series ranges from \$9,975 to \$16,250. VCI 2000 series products cost between \$5,800 and \$7,200.

Simpact 9210 Sky Park Court San Diego, Calif. 92123 619-565-1865

Gateways/Bridges/ Routers

Cisco Systems, Inc. has announced a dynamic routing protocol that enables users to build operational computer networks based on the International Standards Organization's Open Systems Interconnect model.

The Interior Gateway Routing Protocol Intermediate System-Intermediate System (IGRP IS-IS) routing protocol can automatically adapt to changes in network topology and perform real-time calculations of traffic, delays and line reliability to determine the best routing paths, the vendor said.

The IGRP IS-IS is offered as a stan-

dard feature with all of Cisco's internetwork routers, whose starting prices range from \$8,000 to \$18,000, depending on model.

Cisco Systems 1525 O'Brien Drive Menlo Park, Calif. 94025 415-326-1941

OST, Inc. has announced Ebase 2000, a value-added network processor that combines the switching power of a data communications node with powerful processing intelligence.

The product, which is based on multiple Motorola, Inc. 68020 Application Processing Units, can implement the Unix operating system and run any Unix application that is compatible with AT&T

Unix System V, Release 3. Outside communications are provided via X.25 communications cards that handle up to 200 packet/sec. at line speeds of 64K bit/sec.

Pricing ranges from \$30,000 to \$100.000.

OST 14225-F Sullyfield Circle Chantilly, Va. 22021 703-817-0400

Front ends/ Multiplexers

Advanced Compression Technology, Inc. has introduced a multiplexer that integrates voice, data and facsimile channels over 48K to 128K bit/sec. digital transmission facilities.

The SDM-T was designed with five medium-speed channels (up to 19.2K bit/sec.) for synchronous or asynchronous data, a high-speed data channel (up to



ACT's SDM-T multiplexer

64K bit/sec.) for connecting local-area networks to other LANs and up to four Group 3 fax relay channels.

The price of a basic unit is \$2,400, and a configuration with six data and two voice channels costs \$6,000. The product is scheduled to ship next month.

ACT 31368 Via Colinas Westlake Village, Calif. 91362 818-889-3618

Wide-area networking hardware

Alantec has announced a T1 interface module for its Multilan switch (MLS) that links up to eight local-area networks with a T1 wide-area network connection.

The T1IM supports standard and fractional T1 connections and enables the MLS to multiplex LAN traffic with existing T1 voice traffic without an increase in transmission charges, the vendor said. Each T1 channel on the MLS can be used for voice or data.

The T1IM is available 30 days after receipt of order for \$3,300; the basic price for the MLS is \$8,800.

Alantec 101 Hammond Ave. Fremont, Calif. 94539 415-770-1050

Racal-Quanta has announced Premnet 5000, a 100M bit/sec. fiber-optic backbone designed for premises distribution and local-area network applications.

The product can transport various data or voice interfaces in LANs or widearea networks. It includes multi-interface nodes that are supported by 100M bit/ sec. fully redundant backplanes. Its nodes can also be used in point-to-point, ring or star configurations, according to the vendor.

A basic unit with one interface costs \$7,600.

Racal-Quanta 5415 E. La Palma Ave. Anaheim, Calif. 92807 714-970-2966

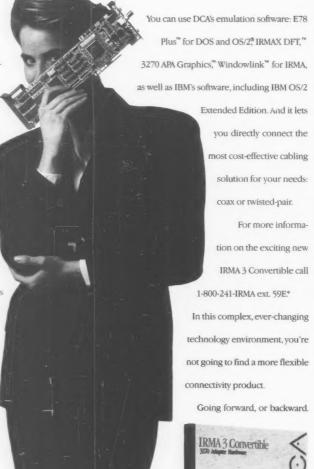
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MANAGER'S JOURNAL

TRACK



William N. Means was named to the newly created position of manager of informa-

tion systems at George Lithograph Co., a printing firm in San Francisco.

During the past 15 years, Means has held top executive positions in hospital organizations with responsibilities that included financial systems and IS.

He has been chief financial officer at French Hospital in San Francisco and Memorial Hospital in Gardena, Calif., as well as controller at Hospital Corp. of America in Nashville.

Means is a graduate of California State Polytechnic University and lives in Foster City, Calif.



Emile A. Bonneau has been named senior vice-president of operations at Rhode Island

Credit Union League in Warwick, R.I., where his duties will include overseeing the league's computing operations

Bonneau, who has more than 26 years of experience in the banking industry, was most recently a vice-president at People's Bank. He is the immediate past president of the Rhode Island Clearing House Association and chairman of the Rhode Island Bankers Association Operations Committee.

The Seekonk, Mass., resident is a graduate of the University of Rhode Island and holds an MBA from Bryant College in Smithfield, R.I.

Who's on the go?

Changing jobs? Promoting an assistant? Your peers want to know who is coming and going, and Computerworld wants to help by mentioning any IS job changes in Executive Track. When you have news about staff changes, be sure to drop a note and photo or have your public relations department write to Clinton Wilder, Senior Editor, Management, Computerworld, Box 9171, 375 Cochituate Road, Framing ham, Mass. 01701-9171.

IS gets its day in the Sun

Oil giant's systems people reap 'subtle but significant' benefits from decentralization

BY NELL MARGOLIS

un Refining and Marketing Co.'s information systems department decentralized last year for the oldest and best reason in the world. "We had no choice," IS director Jack Donohue says.

Philadelphia-based Sun R&M is one of the several companies that make up Sun Company, Inc. At 105 years of age and with nearly \$10 billion in revenue, Sun is one of the U.S.' venerable oil giants

Today's energy companies tend to be short on complacency, big on change and death on anything that doesn't help the business. The energy company IS department that wants to survive and thrive, Donohue says, will do well to adopt similar priorities.

Last year, Sun R&M held a fourmonth, companywide brainstorming project called Sun Organizing For the Future. Business and IS management emerged from the project convinced that business systems and applications people had to start working directly in and for the business units they served.

"What we had to do for the business was demystify technology, get people to understand how it could be used for their benefit and then use it," says Donohue, a 23-year Sun veteran who has headed IS for seven years. "What we had to do for the systems people was get them closer to the business problems they were helping to solve."

While it is still early in the game, Donohue says, it appears that these goals are being achieved.

One goal that was not on the agenda was boosting IS people from second- to first-class citizenship in their company. However, roughly one year after the



Sun R&M's Pancione (left) and Donohue aim to bring IS workers closer to the business problems they are helping to solve

first IS folks left the parochial comfort of their department and set out for such relatively alien territories as Lubes, Fuels, Refining & Crude Oil and Finance, this is the bonanza they say they have reaped.

Mike Pancione became manager of fuels systems for Sun R&M's Fuels division, reporting directly to the vicepresident in charge of that business unit. "Did I feel on the outside before?" Pancione says. "Yes, I did."

Although Pancione says he was not mistreated in any way while serving a Sun business from an IS base, he points out, "I wasn't necessarily a first-class citizen. I think that's true of every systems person who is not part of the business of The Business."

The advantage he now prizes was not one he saw coming, Pancione says. Before June 1989, as manager of systems for the Crude Oil group, he re-

ported directly to Donohue and indirectly to the group's vice-president.

"When we first started discussing the possibility of a straight-line report [to a business head]," he says, "I felt that either way would be OK, that I wouldn't feel any difference."

The difference he found, Pancione says, "is subtle but significant. As a solid-line report to a business head, I'm sitting in budget meetings, merit meetings to decide who gets what bonuses — places I'd never been before."

Sun R&M finance manager Tom Fitzpatrick, who now reports to Sun Vice-President of Finance Peter Weitneight instead of to Donohue, agrees. "You're in the room when decisions are being made," he says. "Just being there is important."

One major reason why, Pancione says, is that mere presence soon trans-Continued on page 74

Systems buyers agree: Reliability is a virtue

BY GARY H. ANTHES

panel of corporate computer systems buyers at the recent Adapso trade conference in Washington, D.C., agreed on at least two points — low prices do not necessarily win, and vendor reputation is of supreme importance.

Ray Lollar, vice-president of information services at Atlanta-based Gold Kist, Inc., said he relied heavily on credit ratings, analyst reports and customer references in choosing a vendor to provide hardware and software for a 106-store point-of-sale accounting and inventory control system.

He cited such virtues as staying power, reliability, dependability and responsiveness in choosing suppliers. Neither leading-edge technology nor low cost was a dominant factor, and Gold Kist rejected cheaper options in favor of a company that it said it

thought would "remain in the business for the long run," Lollar said. When Delta Air Lines

When Delta Air Lines needed an interactive audio response system for receiving telephone requests from pilots and flight attendants, it cited technical capability as the most important vendor criterion. After that, Delta sought financial strength,

company reputation and track record, according to systems manager Harry Burnette.

Burnette said he carefully checked customer references supplied by ven-

dors and was amazed to find that many gave poor accounts of the bidders' past performances. The vendor chosen was not the low bidder, he added.

Richard Elmore, vicepresident of information systems at CBS Records International, also cited staying power as a key quality sought in bidders for a new artist royalty system. Two out of 10 bidders were rejected on the basis of reputation, he said. CBS chose Ernst & Young for the job, even though it had submitted a

bid substantially higher than the lowest cost proposal.

"The essential message of all this is that there are no tricks, no shortcuts," Elmore said.



BOOK REVIEW

To Dad, with love: Watson Jr.'s Big Blue autobiography

FATHER, SON & CO. By Thomas Watson Jr. Bantam Books, \$22.95

It may be hard to imagine for longtime industry pros, but the current generation of computer professionals hardly equates the name Watson with IBM. It has been, after all, 20 years since Thomas Watson Jr. stepped aside as chairman of IBM, marking the end of nearly 60 years of Watson reign at the industry's preeminent company.

To those who remember, however, the name Watson was synonymous with Big Blue. T.J. Watson Sr., the autocratic but benevolent entrepreneur, laid the foundation and built the structure for what became the modern IBM. His son Tom took the company into computers and spearheaded its record-breaking

Now, Watson Jr. has decided to tell his story. It took nearly a decade of persuading by friends and publishing heavyweights, but in Father, Son & Co., Watson pours out a shockingly candid view of his tempestuous relationship with his father and the great weight that IBM became for him. The book is receiving mixed reviews in the business and general press, but make no mistake: This is a must read.

The book offers an intriguing look inside one of the best known father/son business relationships in history, while at the same time providing a high-level view of the company heretofore missing from the myriad IBM corporate biographies.

True, the book is flawed: It is too long, many of the key IBM stories are a bit sanitized, and Watson's tales of yachting trips, ski houses and his decidedly upper-crust reality can be a turnoff.

Even so, the book is an engaging read, told in a straightforward first-person voice that offers no apologies; it just plows head-on into one of the strangest person-

al/business relationships ever told.

From the outset, Watson paints a picture of a father/son relationship that could serve as the prototype for a good Freudian analysis. Watson Sr. was the classic rags-to-riches, Horatio Alger type, a quintessential salesman who built his business on a deep belief in people and structure. He believed in company songs, mottos and loyalty. He kept his hand in every aspect of the business, traveling endlessly to meetings, dinners and functions to see and be seen by the IBM masses.

When a train carrying IBM families to a company function in New York crashed upstate, Watson Sr. climbed out of bed at 2 a.m. and drove all night to the scene. He ordered in extra medical care, paid for everyone's expenses and spent the next day in the hospital with the injured.

The senior Watson's generosity was matched by an obsessive eye for detail and an enormous ego. His picture hung in every IBM office in the land. He became personal buddies with the likes of Franklin D. Roosevelt and succeeded in becoming bigger than the company he ran.

For his oldest son, Dad's success was a haunting and heavy burden. Born into wealth and privilege, young Watson simply had no way to copy his father's feats. Yet he felt compelled to confront and conquer this daunting demigod from early on.

The relationship Watson describes is at times bizarre. For example, he describes endless, intense fights with his father, fights that would leave both men in tears and emotionally shattered. But immediately, a simple note pledging admiration and love would patch the wound and allow the pair to struggle forward to the next explosion.

In a recent interview with Computerworld, Watson said he intended this book to be a "love story." If so, it is a painful love story indeed.

Watson gives himself no quarter. He is terrifically hard on himself throughout the book and often portrays himself as a spoiled, temperamental brat who felt bad but would still use his father's influence whenever it was needed.

For example, as a young IBM salesman in 1940, he was handed a major account by his father and achieved his yearly quota on the first business day of the year. Rather than demand equal treatment, Watson says simply, "I was demeaned."

When the elder Watson died in 1956 at 82, Watson Jr. was thrust into the lonely role of running IBM. Here he paints a vivid picture of the insecurity of taking over one of the major corporations in the U.S. Ironically, Watson shines here, but you wouldn't know it from the

tenor of his words. His self-doubt pervades the entire

Nonetheless, Watson forcefully led IBM out of the punch-card era and into computers. He built the company from less than \$500 million in revenue to a \$7.5 billion behemoth, along the way reorganizing and restructuring with such innovation that IBM became the classic busi-

ness-school case study of how to run a

Watson doles out the credit generously to Al Williams, Vin Learson and other key executives, but it is clear that he learned his father's lessons well. In the midst of tremendous growth, he managed to maintain IBM's people-first environment. He instituted, for example, innovative and generous benefits, stock options and retirement packages for the work force.

Perhaps the most interesting section for IS readers is the development of the System/360. "It was the biggest, riskiest decisnion I ever made," he says about pushing the 360 product announcement up far in advance of the time the machine

would be ready. When the system was introduced on April 7, 1964, some of the equipment included wood mock-ups. Though the entire development process put all of IBM through an intensely emotional wringer, the resulting computer

changed the industry and brought in billions for IBM.

A heart attack in 1970 caused Watson to retire at age 56. He describes, in too much detail, his sailing adventures and his short, troubled career as U.S. ambassador to the Soviet Union under President Carter. However, he also weaves in his coming to terms with his father in his later years, a sadly touching revelation.

Watson has clearly mellowed since his halcyon days at IBM. He took up helicopters at age 62 and claims to still be buzzing solo around the New York area in his whirlybird today. A robust 76, Watson hobnobs with the likes of Soviet President Gorbachev and the nation's Who's Who. His book immediately jumped onto The New York Times bestseller list, which proves that despite a decade out of the limelight, Watson is still an intriguing subject to a lot of people. After reading this book, one must wonder what kind of book Tom Sr. would have penned.

GLENN RIFKIN

Rifkin is a Computerworld features editor.

Insurance firms lag behind

BY ALAN J. RYAN

ATLANTA — The insurance industry, on the whole, has not yet begun to tap the wealth of management and planning resources available through the effective use of information technology.

Those were the findings of a study released earlier this month by Cambridge, Mass., consultancy Arthur D. Little, Inc. on behalf of LOMA (Life Office Management Association), an Atlanta-based insurance industry research, education and information provider.

The results did not come as a surprise to Laurence P. Chait, director and manager of Arthur D. Little's information systems planning practice, who authored the report and managed the team that conducted the study.

The study, called "Information Technology: Achieving the Potential," showed that although some companies are making gains using technology, there is a general failure to get complete benefits industry-wide. Chait said.

"That doesn't mean they don't use technology or that the systems don't work, because they do," Chait said. "But if you compare what they might get compared with what they do get, there is a significant gap."

The study consisted of both one-onone and group interviews with more than 150 IS managers and other senior executives across the insurance industry.

Chait acknowledged that companies can never achieve the full potential of information, because the potential is a moving target. "It keeps growing faster than our companies can assimilate technology's advances and capitalize on them," he wrote in the study.

In the insurance industry in particular, Chait said, many technology applications "simply automate tasks — fill in the blanks on a claim form faster, for example. Forms are created faster, but then the printed form still moves from one desk to the next."

The report suggested that senior managers use the following four processes to better achieve the potential of today's information technology:

Understand the technology.

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- Develop an explicit role for information technology within your vision of the organization.
- Communicate your vision and expectations throughout the organization.
- Be involved in information technology planning and management, participating directly and monitoring performance.

Line managers must then follow by having the responsibility of integrating the technology into the fabric of the work they manage, according to Chait.

"Line managers must learn to conceive of information as an asset to exploit, and they must view information technology as capital in which to invest aggressively," he said.

The information technology professional in all of this must play a pivotal role — moving away from the data center and moving toward strategic business involvement. The IS manager must ensure that support organizations can implement senior executives' visions, establish a group to watch and assimilate new technologies and become directly involved in corporate strategic planning.







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Sun

FROM PAGE 71

lates into not-so-mere power. For the first time in his 13 years at Sun, he says, "I get to have an impact on the way people act who are not computer people. I'm treated as an equal. It's becoming easier to do my job."

The importance of being there has not been lost on Donohue, who is widely credited as one of the major forces behind the decentralization of his own department.

"Ownership makes a big difference," he says. "I think you're just talking about human nature."

Unlike some observers of the IS community, Donohue does not believe that corporate IS will come of age only when the IS director is looked upon as a potential chief executive officer. However, he says, "The IS director does have to be a general manager and be recognized as such

within the company. Being part of the corporate planning team is a powerful position. Being there is the next stage for us."

Donohue says he believes that the wall between systems and corporate will not really be torn down until crossovers occur in both directions.

"Somewhere down the pike, I hope to see not just systems people in the businesses, but business people in systems," he says. The harder it is to tell who's what, he adds, the easier it is to do what's needed to fuel the company.

It is especially important, both Pancione and Donohue say, to soften the lines between traditional 1S and corporate as the distinctions between the day-to-day necessities of such age-old divisions are vanishing.

"The oil flows across the company," Donohue says. "There are real business reasons for integrating the way we are."

The bottom line for Sun's IS, and ultimately for the whole company, is the criticality of information — and the need for dispersal of the talent and ability to deal with it.

"Hardly anyone at this company ever sees a barrel of oil," Pancione says. "Everything is on a computer screen somewhere."

Services demand to grow

BY SALLY CUSACK

The demand for systems operations services, including outsourcing of facilities management, will grow from a \$5.9 billion market in 1989 to \$12.8 billion by 1994, according to a recent study by Input, Inc., a research and consulting firm in Mountain View, Calif.

Input broke the market into two categories: processing and

Boom time

professional services.

Under the processing services mode, the vendor provides all planning, management and operations services for the client — using vendor-owned equipment. Doug Wilder, manager of systems integration at Input, said this mode of operations is growing at a compound annual rate of 18% and is most prevalent in the commercial sector.

With a compound annual growth rate of 13%, professional

services - in which vendor-provided personnel plan, manage and operate clientowned equipment - is most popular in the federal government market, the report said. The government prefers to own its own equipment, but markets commercial want to offload the investment," Wilder said.

The report also indicated that the growing need for systems integration services is fueling the move toward outsourcing by establishing confidence in long-term contracts.

The blurrier the better

un R&M's IS director, Jack Donohue, would like to see the distinctions between information systems people and business folks dim even further than they already have. The more they do, he believes, the better things will run. And the day Donohue can tick this item off his wish list may not be that far down the road.

In the Fuels division, new manager Mike Pancione is hoping to stage a trial run within the next several months. One of the systems people has been working closely with one of the users in fuels. When the user takes a vacation later this summer, Pancione says, he may move the systems person into the user's job.

"How much damage can you do in a week?" he says. If the answer turns out to be as he suspects — none, but you can do a lot of good — Sun can expect to see more such switches.

"People get trapped in their day-to-day jobs and end up not seeing the big picture very well," Pancione says. "It's important to blur the lines."

NELLMARGOLIS

Demand for systems integration and outsourcing is fueling growth in IS services U.S. user expenditures (in billions of dollars) 4.3 2.9 1.6

Professional services Processing services 13%** 18%**

*projected
**compound annual growth rate

Source: Input. Inc.

1989

CW Chart: Paul M

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TAKING CHARGE Alan J. Ryan

Too slim to be believed?



A memorable cartoon I once saw had the caption, "I've been wearing a 34-inch waist since high

school." The sketch shows an older gentleman wearing his trousers hiked up to just under his armpits and bragging to a friend; meanwhile, his bulging 50-inch waistline is putting the pleats of his pants to a serious stress test.

That cartoon reminds me of some information systems organizations that claim to be, in their terms, "moving toward a flatter organization by eliminating the hierarchical management pyramid."

What they are saying, of course, is that they are trying to eliminate some of the middle layers of management. But until

I really see it happening, I'll still assume that though they claim to be flatter, they are actually girdling a 50-inch waist into a 34-inch waistband.

We've all heard the claims of the parent companies that say the term "layoff" is banned from their corporate vocabularies. I hate to be an instigator, but why is it that flattening com panies that don't have layoffs seem to experience a rapid rise in attrition?

Am I the only one who has noticed that the same IS chiefs who just a few years back would boast of having only a 5% rate of attrition in their shops now use phrases like, "Through attrition, we were able to eliminate eight midlevel managers over four months"?

And if the attrition rate does not rise, then couldn't one assume that it may conceivably take years to achieve a flatter organization? If that is the case, perhaps companies will learn to get a little more creative to bring about the flat organization they claim they desire.

For instance, IS shops may take all of the midlevel managers aside, issue new business cards and call them all consultants. What a coup! A layer of management has vanished on paper, the organization is flatter as far

as the cataracted eye can see, and the company still retains all of the people who can provide that midlevel management point of view.

Some workers are offered their walking shoes in the form of "early retirement." If the word does not get out that their chances of being hired are slim in these days of flatter organizations, they might actually grab the golden parachute and fly. At

least they will be out of your hair.

A third alternative is to spin off divisions and/or groups at the rate of one or two per month—thereby creating a home and an important-sounding title for a midlevel manager without having to hike salary levels.

An assistant director of systems development might become vice-president of systems development for the corporate headquarters staff; a programming team leader might become "senior vice-president of Cobol programming," and a director of PC training might become "vice-president/training, corporate systems group."

So, keep hiking those trousers up. No one will notice, real-

Ryan is a Computerworld senior

MANAGEMENT BRIEFS

ASM lines up new 1990-91 slate of officers

The Association for Systems Management (ASM) has announced its slate of international officers for the 1990-91 year.

Newly elected officials of the sociation, which represents 8,000 information systems managers, analysts and consultants internationally, were installed earlier this month. President Scott J. Beltz, manager of Extended Systems, Inc., in Boise, Idaho, is president of the Idaho Intermountain chapter of ASM. President-elect is Paul R. Saunders of the Nashville chapter. He is also president of Saunders Systems Corp. in Nashville.

Vice-president is Linda J.

Menard-Watt of the Sun Parlour chapter, who is manager of administration information systems at the University of Windsor in Windsor, Ontario. Treasurer is William D. Munch of the East Bay chapter. He is an IS consultant in Pleasant Hills, Calif.

The new secretary is Ross A. Flaherty of the Fort Worth chapter. Flaherty is director of information resources management and the Microcomputer Resource Center at Texas Wesleyan University in Fort Worth.

Nominations are due by Aug. 1 for the Professionalism in Service Management A-

ward, presented by AFSM International in conjunction with the Data Group.

Winners of the award, which was created in 1986 to honor service managers whose professional and personal activities have "done the most to increase the professional image of managers in the high-technology services industry," will be notified by Sept. 15. The award will be presented at the 16th AFSM International World Conference to be held Sept. 30 to Oct. 3 in Rosemont, Ill.

For more information and nomination forms, contact AFSM International in Fort Myers, Fla., (800) 333-9786.

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CW 6/18/9

CALENDAR

Consulting skills, communicating effectively with information systems clients, leadership, end-user computer support and marketing the IS organization internally are some of the topics that will be covered at the 5th annual Ouellette & Associates Summer Workshops to be held Aug. 20-23 in Nashua, N.H.

The theme of the conference will be "Developing the Human Side of Technology." NBC News correspondent Irving R. Levine will be the keynote speaker. For more information, contact Ouellette & Associates at (603) 623-7373.

JULY 8-14

Information Center Conference and Exposition.
San Francisco, July 8-12 — Contact: Weingarten Publications, Boston, Mass. (617) 542-0146.

American Production and Inventory Central Society Seminar and Exhibition. San Francisco, July 9-11

- Contact: APICS, Falls Church, Va. (710) 237-8344.

Softwere Engineering Strategies Conference. Vancouver, B.C., July 9-11 — Contact: Ashley Pearce, Gartner Group, Stamford, Conn. (203) 967-6757.

Navy Micro '90 Conference. San Diego, July 9-12 - Contact: Nardac, San Diego, Calif. (619) 545-8645.

Consulting Skills for the Information Processing Professional. Los Angeles, July 10-11 — Contact: Ouellette & Associates, Bedford, N.H. (603) 623-7373.

Information Networking: Technologies & Applications. Washington, D.C., July 10-12 — Contact: Ms. Schoen, Bell Attantic Educational Services, Princeton, N.J. (800) 327-8412.

Service and Geality: Transforming the Vision Inte Reality. St. Louis, July 11-13 — Contact: Donna Staggs, Washington University, St. Louis, Mo. (314) 889-4555.

JULY 15-21

Association of College and University Telecommunications Administrators Associa Conference and Exhibit. Orlando, Fla., July 15-19 — Contact: Liss McLemore. ACUTA. Lexinatos. NY. (690–) 252-2882.

Managing Quality Function Deployment. Dallas,

July 16-17 — Contact: Technology Training, Torrance, Calif. (213) 534-3922.

EDI in the international Marketplace. San Francisco, July 16-18 — Contact: International Congress Registrar, Alexandria, Va. (703) 838-8042.

Engineering Workstutions Conference. Boston, July 16-18 — Contact: EWC, Santa Monica, Calif. (213)

Industrial and Engineering Applications of Artificial Intelligence and Export Systems. Charleston, S.C., July 16-19 — Contact: Dr. Moonis Ali, University of Tennessee Space Institute, Tullahoms, Tenn. (615) 455-0531.

Telephone Network Overview. Cincinnati, July 17-18 — Contact: CBIS Network Technologies, Cincinnati, Ohio (800) 543-4477.

Database World Conference & Exposition. Santa Clara, Calif., July 17-19 — Contact: Digital Consulting, Andover. Mass. (508) 470-3870.

Macintosh/New York Conference & Exposition. New York, July 17-19 — Contact: Exposition Management, Waltham, Mass. (617) 290-0400.

Developing Procedures, Policies and Documentation. Houston, July 17-20 — Contact: Information Mapping, Seminar Division, Waltham, Mass. (617) 890-7903.

Multivender Networking: Unking PCs, Minis and Mainframes over Local- and Wide-Area Networks. San Francisco, July 17-20 — Contact: Learning Tree International, Los Angeles, Calif. (800) 421-8166.

SNA Gateways: An in-Depth Examination. Santa Clara, Calif., July 18-20 — Contact: J2 Software Laba, Santa Cruz, Calif. (408) 292-6300.

Sun User Group Western Regional Conference. Sunnyvale, Calif., July 19-20 — Contact: Joanne Lee, SUG, Palo Alto, Calif. (415) 336-0564.

JULY 22-28

North American Conference of International Business Schools Computer Users Group Moetlegs, Omaha, July 22-25 — Contact: Sufi Nasem, College of Business Administration, University of Nebranka, Omaha, Neb. (402) 554-2816.

GUIDE 77 Convention of Midsize and Large-Scale IBM Systems Users Group. Chicago, July 22-27 — Contact: Guide International, Chicago, Ill. (312) 644— #510.

The CAMMP Show for Computer-Aided Graphics, Multimedia and Presentations. Chicago, July 23-27— — Contact: Knowledge Industry Publications, White Plains, N.Y. (914) 328-9157.

Multi-Net Expe '90. Houston, July 25-26 — Contact: Ann Garner, Multi-Net Expo, Houston, Texas (713) 827-8030.

Utah State University IT Institute. Logan, Utah, July 25-28 — Contact: Monique Squire, Logan, Utah (801) 750-1690.

Knowledge Acquisition & Engineering Conference. Cambridge, Mass., July 26-27 — Contact: International Business Communications, South Natick, Mass. (508) 850-4700.

Marketing the IS Organization Internally. Chicago, July 26-27 — Contact: Quellette & Associates, Bedford, N.H. (603) 623-7373.

JULY 29-AUGUST 4

Al-1990 Conference. Boston, July 29-Aug. 3 — Contact: American Association for Artificial Intelligence, Menlo Park, Calif. (415) 328-3123.

Insourcing vs. Outsourcing: The Summit Meeting. Atlantic City, July 31-Aug. 1 — Contact: The Yankee Group, Boston, Mass. (617) 367-1000.

Computer Security in the '90s Conference and Exposition. Atlanta, Aug. 1-3 — Contact: Inforum, Atlanta, Ga. (800) 343-5048.

Software Measurement and Estimation Seminar. Boston, Aug. 2-3 — Contact: Digital Consulting, Andover, Mass. (508) 470-3880.

Seminar. San Antonio, Aug. 2-3 — Contact: Quest, Spotswood, N.J. (201) 251-3217.

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Not everyone is out to set a speed record

BY ALAN RADDING

any people hear about the power of an Intel Corp. I486-based personal computer and ask "why?" For others, the response is closer to a "why not?" or even "how much?" A lot of corporate buyers view the 486 as merely a much faster version of the Intel 80386-based machine. Whereas the 386 took desktop computing from 16- to 32-bit capabilities, the 486 is very similar in architecture to its predecessor. It uses the same basic instruction set as the 386, but it outperforms the 386 and delivers better price/perfor-mance through the physical integration of the math coprocessor and cache on the same chip as the CPU. According to some figures, a 25-MHz 486 performs two to four times faster than a 33-MHz 386, depending on the application and a number of systems design and implementation

features Speed issues get more yawns than praise from many corporate microcomputer managers - at least until there is software and an operating system that can take advantage of its power.

"Last year, people wanted to talk about the differences between the 286 and the 386. But with the 486, there's nothing [new] to discuss," says Roger Bender, vice-president of Citibank NA's investment banking division in New York and president of the New York Micromanagers Association.

In addition, these managers ask, who needs all that power? The "why-not" segment of

the market may be inclined to agree that it doesn't need the power today, but these managers figure that the 486 will come in handy for future needs.

Ed Bussean is a member of this group. At Commonwealth Edison's LaSalle County Station, a nuclear power plant just outside of Marseilles, Ill., Bussean is building his company's first PC network. For the server compo-

Radding is a free-lance writer based in

to Awaken Only a 32-bit OS can unlock the riches of the 486. Page 83.

Power

"A 386 would probably do the job, but I don't know anybody who ever bought too much com-puter." says Bussean, PC administrator at the firm. "We may not [take full advantage of] the 486 today, but a year or two years from now . . . well, these things always snowball." **Speed demons**

The real enthusiasts - those excited about the new speed threshold - are people frustrated with DOS applications that run slowly even on high-end 386s. These buyers are using the machines as supercharged 286s and 386s and finding them handy for large databases.

486-based PCs, including one

from AST Research, Inc.

Steve Geier, associate director in the finance department at New York Telephone, couldn't wait to see how the 486 would handle his very large financial modeling application that ran on

a 200M-byte database. Formerly a Compaq Computer Corp. and AST user, Geier shopped around for a low-price computer and settled on a machine from Digital Distributing, a vendor that was just entering the market.

When Geier saw runtime decrease from 33 to 21 hours, he ordered two more 486s for other large financial models.

At Wilson Jones Co., a Chicago-based office products marketer, Richard Lange knew he wanted a 486 machine to take sales data from the mainframe and create tables and reports for marketing personnel. Although the company is traditionally IBM-oriented, Lange chose a Compaq Deskpro 486 for its performance capability and reduced the application's runtime from 11/2 days to a few hours. "Everyone is hungry to get the information as quickly as possible," says Lange, an information systems manager at the company.

Computer-aided design users

who have 4M- and 5M-byte files don't give the 486 decision a second thought. Wilsey Ham Pacific, an engineering firm based in Bellevue, Wash., has already purchased three Hewlett-Packard Co. 25-MHz Vectra 486 machines. Wilsey Ham still relies mainly on its 25-MHz 386s, also from HP, but it creates its larger

Autocad drawings on the 486s. "The size of our drawings keeps getting larger, so we wanted the fastest thing we could get," says Mike Gibbons, a computer systems manager.

We're using a 33-MHz 386 PC now, but we've ordered a 486," says Nolan Walker, managing director at Varitech in Beaumont, Texas, a subsidiary of Gulf States Utilities. "I don't know what the difference will be yet, but I want to find out.

Far to go

However, while the powerhungry are buying 486-based machines, these PCs are far from becoming a corporate standard.

Compared with Intel's 286, 386 and even 8088 and 8086 PCs, the 486 will lag far behind in units shipped for several years. In 1989, only a few hundred thousand 486 machines were sold, compared with two million 386 machines and 5.3 million 286 PCs, says David Cearley, program director at Gartner Group, Inc., a market



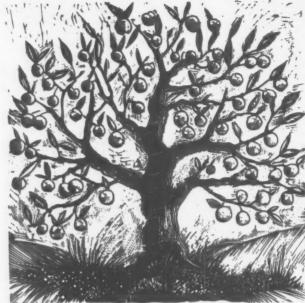
INSIDE

Product Guide A list of 486-based PCs out now or shipping soon. Page 93.

Which Way Is Up? There's more than one way to upgrade to higher power. Page 88.

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Speed

FROM PREVIOUS PAGE

research firm in Stamford, Conn.

Cearley says he expects the 386 to continue growing in popularity, reaching 4.6 million units sold in 1991 and 11.6 million in 1992; on the other hand, unit sales of the 486 are expected to grow to 300,000 in 1990, 600,000 by 1991 and 1.1 million in 1992

Within the Fortune 500, companies are not rushing into any purchases, according to The Sierra Group, Inc., a market reespecially in an area as important as file serving," Bender says.
Instead, companies are more

likely to install something that has already demonstrated some success, he explains.

Another problem is that the 486 chip does not address the major bottleneck in LAN fileserving applications: the operating system and the hard disk I/O.

There's no difference when you use a 486 as a file server. You're already limited by the bandwidth of the token-ring network," says Art Block, vicepresident of end-user automation support at Manufacturers dard, a few things have to happen: Prices need to come down, and a new operating system, applications software and bus peripherals need to appear.

While 486-based machines are not a huge jump in cost above a 386-based machine and actually rate well in price/performance, they are generally still above the level that is acceptable to corporate buvers.

They have to get below the \$5,000 threshold before corporate buyers will start buying them," says Leslie Fiering, an analyst at Gartner Group, Inc.

A major constraint for the 486 is that neither DOS nor OS/2 at its current stage of development fully taps the processor's potential. In fact, there is still very little software that takes full advantage of the expanded instruction set or 32-bit architecture of the 386, never mind the 486.

'People are still running applications [on the 486] that were written for their ATs and even the original 8088/86 PCs," says Phil Magney, director of sales and marketing at ARS/Workstation Laboratories, a technology research firm in Irving, Texas.

New taste sensations

Although Intel's newly released 33-MHz I486 is expected to outsell the 25-MHz version by 1992, an I586 should outsell both of them by 1994

				Num	ber of units	shipped (w	orldwide)
		1989	1990*	1991*	1992*	1993*	1994*
1486	25 MHz	10,000	400,000	1.1M	700,000	500,000	400,000
	33 MHz	0	10,000	400,000	1.1M	1.5M	1.5M
1586		0	0	10,000	400,000	1.1M	1.9M
Total	486/586	10,000	390,000	1.5M	2.2M	3.2M	3.8M
							Projected

search firm in Tempe, Ariz. While 70% say they plan to evaluate the 486, they say they wouldn't make any purchases for about 12 to 18 months or until prices go down. Even when they do purchase 486s. Fortune 500 companies aren't eveing largescale purchases for the desktop. They say they will position the machines as local-area network file servers or engineering workstations for computer-aided design, graphics and statistical analysis.

The server area hasn't quite caught on, however. The newness of the 486 discourages some companies from implementing it. "There is no reason to go with Release 1 of anything,

Hanover Corp.

The difference, he says, comes when you use a 486 as an application server, where it is called on to perform application processing as well as simple file serving. Manufacturers Hanover is poised to do just that with its Lotus Development Corp. Notes application, which is set up to operate in a full client/ server capacity.

"The server must perform Notes computations on behalf of many clients," Block explains. As such, it does more than simple file serving and, therefore, needs more processing horse-

Before the pendulum swings to the 486 as the corporate stanBit by bit

While Unix takes advantage of 32 bits, few PC users are willing to venture into that environment. It has been promised that OS/2 Extended Edition will take full advantage of the 486, but OS/2 Extended does not yet exist, and no one knows how far behind it applications might be.

"If you're buying a 486 to run OS/2 Extended Edition, OK but if you're buying OS/2 to run DOS applications, there's no point in buying OS/2," says Tom Nolle, president of CIMI Corp., a technology assessment firm in Vorhees, N.J.

While Nolle usually steers his Continued on page 84

Happily ever-aftering with 32-bit partnering

Intel Corp. I486-based hardware is a little like Cinderella; a heck of a workhorse but forced to wear hand-me-downs when it comes to applications.

What will play the prince's role in this tale, according to analysts, is a 32-bit operating environment. Only this kind of match will inspire software developers to produce designs that will bring out the processor's true

Without a 32-bit operating system, a 486-based personal computer can merely run existing PC applications faster, says Karen Offermann, associate editor and analyst at Datapro Research Corp. in Delran, N.J. With a 32-bit operating system en-abling multitasking, "the poten-tial is outrageous," she says.

Turning point

According to Offermann, the turning point will come with the introduction of OS/2 Extended Edition, Microsoft Corp.'s 32-bit version of OS/2, which is expected later this year. For the first time in PC history, Offermann says, there will be a "marriage of powerful hardware with the appropriate software.

Of course, OS/2 Extended is not the only potential 32-bit partner for the 486. There is also Unix. Although Unix has one big strike against it - "a reputation of being arcane and difficult to use" — Offermann says she thinks it may actually be better able than OS/2 to exploit the potential of the 486 systems.

For instance, while both operating systems support multitasking, OS/2 needs to be networked to support multiple users. Also, Unix can be ported from larger systems, such as minicomputers, down to the Intel 80386- and 486-based PCs. More important, it is available now.

The aspect of portability could be quite important, especially in the early stages of the 486's existence. What will inspire many users to pledge fealty to the 468, says Andrew Sey-bold, publisher of "The Outlook on Professional Computing," a Santa Clara, Calif.-based industry newsletter, will not be a whole new playlist of applications but its ability to redub existing minicomputer applications, most of which are already running in 32-bit environments.

"Users already have their vertical packages, such as accounting and inventory control, running in 32-bit environments. If they can buy a 486 instead of a

Weixel is a free-lance writer based in Framingham, Mass.

VAX and put it on someone's desk instead of hiring more MIS staff, of course they're going to do it," Seybold says.

Neither Unix nor OS/2 may seem at first glance like anyone's idea of a charismatic rescuer. The magic, analysts say, is in the 486's similarity to the 386. Until now, there had always been instability in the PC hardware platforms. But because the 486 is binary-compatible with the 386, writing for a 32-bit platform is a alatable idea to developers. With the two types of machines, they've got a bigger and steadier target at which to shoot.

With the 486, developers know they have a stable period of four or five years in which to get a return on their investment, says Leslie Fiering, an analyst at Gartner Group, Inc., in Stamford Conn

Slow resolution

No one really thinks this happy ending is going to arrive quickly. Paul Saffo, research fellow at the Institute for the Future in Menlo Park, Calif., believes that for a few years at least, the 486 will be out to use running souped-up 386 applications.

"Chances are, they will be quite dull in terms of new applications," Saffo says.

He does expect that the 486 will eventually redefine desktop applications. "In the year 2000. users won't be asking, does it run Lotus?" he says.

Like Seybold, Saffo says that one of the key attributes of the 486 hardware base is the fact that it is the first so-called PC powerful enough to support applications traditionally run from workstations and minicomputers. Saffo also says he thinks that the most vital function in a distributed networking environment is the ability of applications to interact with one another. He likens a 486 running a 32-bit operating system to time-sharing. with a twist.

"From your desktop, you'll be able to manage a sophisticated modeling task by sending some parts to a mainframe for processing and some parts to a supercomputer for processing and even some parts to a neural net[work] supercomputer for processing," he says.

Saffo says he envisions the 486 providing users with a link to outside sources for sophisticated data gathering.

"People will be less likely to turn the machines off. They'll come in in the morning and be able to make use of the work done by the computer overnight," he predicts. ●

The workstation factor

As if corporate microcomputer purchasers didn't have enough to think about, now they have the slippery categories of "personal computer" and "workstation." As workstation prices decline and PCs grow more powerful, us-

ers can use either for intensive computational needs on the desktop. Intel I486-based PCs have been

found to meet and in some cases beat the performance of low-end reduced instruction set computing (RISC) workstations, according to ARS/ Workstation Laboratories in Irving. Texas. The lab used Khornerstone benchmark ratings based on 21 tests measuring CPU, floating-point and disk I/O and tested such workstations

as Digital Equipment Corp.'s Decstation 3100, Data General Corp.'s Aviion and Sun Microsystems, Inc.'s Sparcstation.

But speed isn't everything; there's also functionality and price. RISC workstation prices have dipped below those of high-end PCs and offer better graphics and networking capabilities.

Also, the 486 chip may have the power to provide workstation-like functionality, but DOS users "don't have anything to take advantage of it," says Tom Nolle, president of CIMI Corp. in Vorhees, N.J. Unix on a RISC workstation, he

says, is a better alternative for users who need advanced functionality.



clined to stick to the PC route, if only

Varitech's

to remain committed to DOS. But there are voices of dissent. "We evaluated the lower priced RISC workstations [for three-dimensional CAD graphics], and if we were allowed to switch to Unix, we would be there," says Nolan Walker, managing director at Varitech in Beaumont, Texas.

ALAN RADDING

clients away from the 486 because of the limitations of DOS and the lack of applications for OS/2, he concedes that "the 486 is probably a smarter buy over a high-end 386, as long as you realize that there will be limited benefits."

For clients who really want the full advantages of the 486, such as true multitasking and multiuser functionality, Nolle suggests that "it is time to start asking about alternative operating systems" such as Unix. "The time is going to come when you don't want to stay in DOS."

Similarly, while many users run their 486-based PCs with the standard AT— or Industry Standard Architecture (ISA)— bus, "you really need a higher performance bus to support a higher performance system," Magney says.

Currently, 52% of 486 users run the ISA bus, 23% use IBM's Micro Channel Architecture (MCA) and 25% use Extended Industry Standard Architecture (EISA), says John Dunkle, vice-president of Workgroup Technologies in Hampton, N.H. By 1993, he predicts, only 7% will use the ISA bus, with 58% opting for MCA and 35% for EISA.

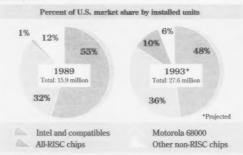
If EISA boards become available in volume sooner, Dunkle notes, it will alter the 1993 projections, but the overall trend will remain the same — the 486 eventually will drive users to use new bus architectures.

Some buyers say that, at least in terms of their current needs, the bus issue is irrelevant. "We have an EISA machine, but we tency with the company's base of Personal System/2 machines, but he resisted.

Others, however, are coming close to hitting the wall with the limited capabilities of the ISA bus. "We're getting to the point where the bus is the limiting factor," Citibank's Bender says.

Coming up on the outside

RISC- and Motorola 68000 series-based workstations will snitch from Intel's market share



Source: Workgroup Technologies, Inc

CW Chart: Doreen Dahle

don't have any EISA cards in it," says Wilson Jones' Lange. The company uses two ISA cards—an IBM 3270 emulation card and a Token-Ring card—in its 486. Lange was under pressure to go with MCA for the sake of consistence.

"By the time we get to 50 MHz, the bus can limit performance. The ISA will choke a 486."

While corporate purchasers balk at standardizing on the 486, for niche users who want the power now, the price differen-

tial is actually not that great between a 33-MHz 386 machine and a 25-MHz 486. Buyers can pay up to \$19,000, if they want a fully configured name-brand 486 PC, complete with extra cache and other bells and whistles. But a shopper who is willing to accept lesser known brands can get a simply configured 25-MHz 486-based machine for a little more than \$5,000 through direct marketers.

When New York Telephone's Geier purchased his 486, he found "a very attractive price" from Digital Distributing. "The big vendors were too expensive. Digital Distributing was cheaper and had better performance," he saws.

Manufacturers Hanover was paying about \$7,500, on average, for a 386-based file server with 8M bytes of memory and a 325M-byte hard disk. For about 10% more (\$8,200), the company purchased a 486-based file server from AST.

"What I'm spending hasn't really changed, but I'm getting more for the money," Block says.

The cost of the 33-MHz 386 is likely to drop; however, many observers expect the differential to remain slight.

Some argue that users who turn to lower priced 486-based

machines from new, unproven vendors risk being left in the lurch when it comes to support.

Some observers attribute the difference in price to differences in the quality of components. Higher priced machines also come with 330M-byte hard drives, compared with 200M-byte drives, and an EISA or MCA bus rather than an ISA. Even when the less expensive 486-based PCs provide an EISA bus, they do not support all the bus master modes, Nolle adds.

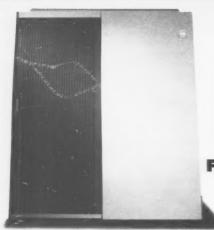
Which direction?

While some experts counsel users to wait for issues such as the operating system and bus master to clear, others dismiss the notion of waiting in the rapidly changing PC market. "New equipment is always going to come out that will be faster," Block says.

Others prefer to wait. "I won't do anything with a 25-MHz PC, not when 33-MHz and 50-MHz machines are coming fast." Bender says.

What users have to remember is that the premium you pay today buys you a short-lived advantage, with higher clock speeds such as 50 MHz expected this fall, not to mention the 586, 686 and 786 chips due out by the year 2000. ●

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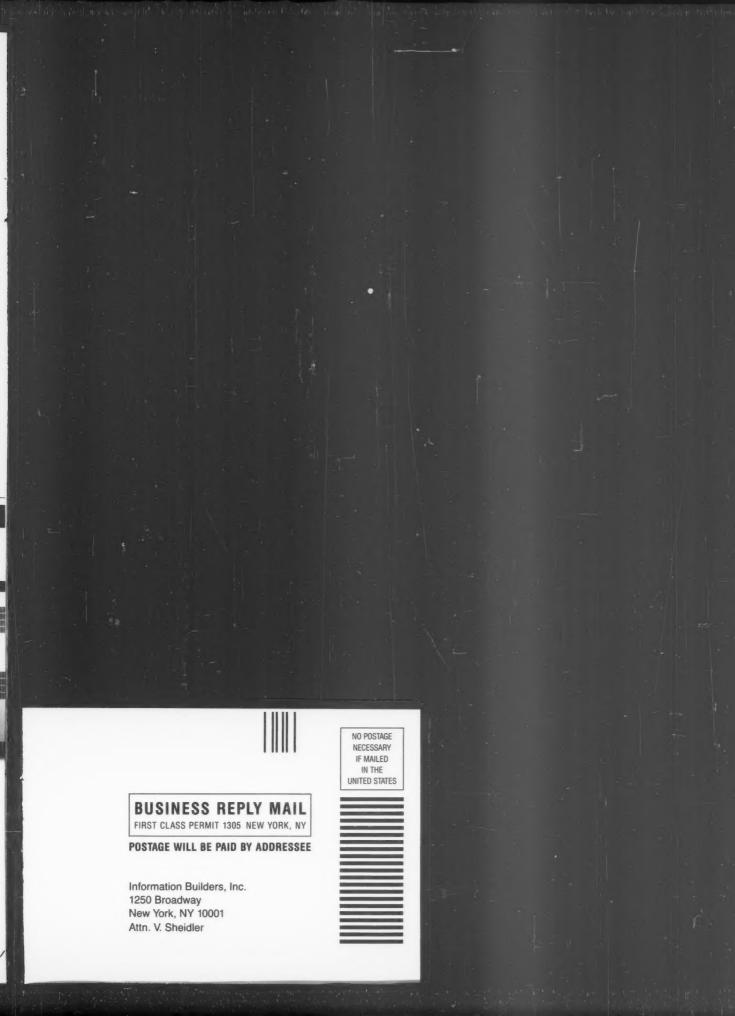
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Cache-ing in on 486 chips

BY DAVID CLAIBORNE

Systems developers are used to reducing numbers on price tags, not on feature descriptions. So when Intel Corp. announced its I486 chip with 8K bytes of internal cache - after people were used to hearing about the

80386's 32K bytes of external cache capability - many of the hardware producers questioned the wisdom of the move and felt compelled to compensate.

Of the vendors shipping 486-based machines in the next six months, about twothirds have added external cache to their machines. Whether a buyer wants 64K bytes, 128K bytes or any extra cache at all is now a subject for debate.

One firm that tested both approaches before developing its Vectra 486 and decided that Intel probably knew best is Hewlett-Packard Co. Not only is it more expensive to design exter-

Claiborne is a consultant in Highland, Md.

nal cache, but performance improvements were marginal, according to Mark Koski, 486 product manager. Other trials bear out HP's conclusion.

On the other hand, Advanced Logic Research, Inc. (ALR) is of

two minds on the matter, believing that while individual users working on a stand-alone 25-MHz machine probably do not need external cache, power users and file server applications do.

For that reason, says David Kirkey, vice-president of marketing and international sales, ALR leaves the decision up to the buyer. Its Businessveisa 486 has no other external cache, while the Powerveisa. Power/E and Power/4 all offer it. "If the user's needs change," Kirkey says, "a 64K-byte cache can be added for \$600.

Intel itself says 8K bytes is just fine. According to the firm's published estimates, the "hit rate" - or the percentage of

times the on-board cache contains the requested data - is 96% with DOS applications and 92% in multitasking operations.

The chip uses a four-way setassociative cache with a 16-byte line. This means that main memory is brought in 128 bits at a time, four times as fast as on the earlier 82385 controller. This reduces cache misses in consecutive data reads.

In addition, the cache is effectively split into four 2K-byte components, improving the performance when jumps are made between blocks of main memory. It is as if you needed to find a reference in a book and could look in four places at once.

What is becoming apparent, however, is that with higher clock speeds on the horizon, external cache will become more valuable. As processor speed increases, so does the severity of the penalty for a cache miss. At 25 MHz and a cycle time of 40 nsec, a cache miss requires four extra cycles to retrieve information from main memory.

At 33 MHz, with a cycle time

of 30 nsec, that number may double to eight extra cycles. Although the hit rate remains the same, the penalty in terms of lost clock cycles and amount of idle processor time doubles.

Possibly in response to this and coinciding with the 33-MHz version of the 486 chip Intel has announced the Turbocache I486. This module provides a system with 64K or 128K bytes of external cache and uses the new 82485 cache controller to provide a two-way set-associative write-through implementation that works in conjunction with the 486's internal cache. The Turbocache I486 will be available in 25- and 33-MHz versions and will range in price from \$250 to \$450.

Intel predicts that the Turbocache will improve performance up to 15% in I486-based systems. According to Bill Rash, Intel's 386/I486 microprocessor focus group director in Santa Clara, Calif., "Applications software written for MS-DOS, Windows, OS/2 and Unix operating systems will continue to become more complex and benefit from a second-level cache." .

Write-back soon

Advanced Logic Research and Arche Technologies use a writeback rather than Intel Corp.'s write-through caching scheme on their models with external cache.

On Intel chips, all writes to memory are written to the cache and then through to main memory. While this approach is very reliable, it can also bog down performance. When the proces sor is operating under a heavy load, such as a multiuser/multitasking environment, the memory bus is consumed primarily with write operations.

The write-back scheme is particularly beneficial in multitasking operations. In this approach, memory changes are made to the cache, and the main memory is updated only when the cache is to be flushed by new information that is coming in. While the vendors claim this speeds performance, there is a small chance that the main memory will fail to be updated.

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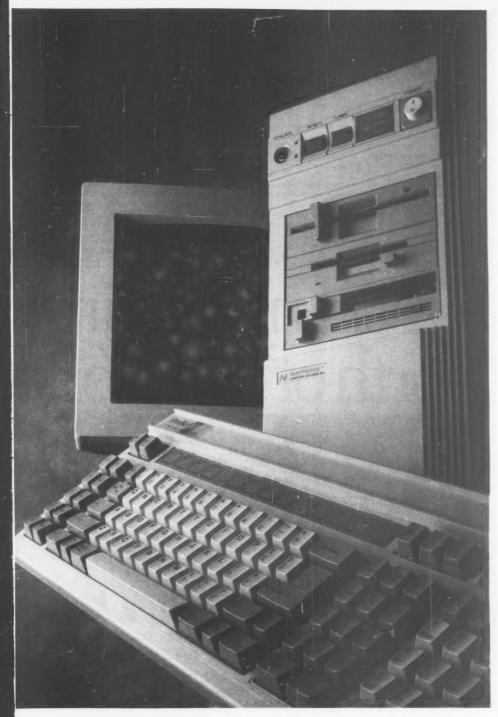
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The 386 upgrade path is viable but tricky

BY DAVID S. VEALE

Even people in search of speed may want to ease slowly into Intel Corp. I486 functionality. With prices declining on 33-MHz Intel 80386-based systems, some buyers may prefer investing in these machines now and then upgrading later — or they may choose one of the "upgradable" 386s now being offered.

There are cautions along the upgrade path, however. The more leisurely pace may disqualify buyers from achieving full 486 functionality, not to mention causing them to spend more than they meant to or taking a partial loss on their 386 investment.

One method of upgrading is with a board that contains a 486 chip. The board attaches via cables to the 386 processor and 80387 math coprocessor socket after the chips are removed.

For many buyers, this option makes a lot of sense. A fast 386 may be all they need for the time being, and there are certainly far more price-competitive vendors from which to choose. In addition, by the time users complete the upgrade, the boards will most likely have come down in price.

In the end, however, this route may not always be economically practical. The reasons have to do with the architecture of the chips themselves.

While the instruction set and operating modes of the 486 are identical to those of the 386, the 486 has a built-in floating-point unit and 8K-byte memory cache and cache controller. On 386 PCs, these features are available only with the addition of the 387 chip, cache memory and the memory cache controller chip.

When the upgrade occurs, these chips are no longer needed, resulting in a wasted investment. In the case of the 387, this can be a loss of \$450 to \$575.

In addition, any external cache you al-

Low money down

n some firms, it may make more economic sense to buy relatively low-priced Intel 80386-based machines and replace them with Intel 1486s when needed, says Ben Myers, a consultant at Spirit of Performance, Inc. in Harvard, Mass. The 386 can then be passed on to an employee who has outgrown his Intel 8086-or 80286-based system.

With some 386 machines now hovering near the \$2,000 mark, this strategy may make a lot of sense. Northgate, a maker of mailorder high-performance PCs, sells a 25-MHz, 486-based computer for \$5,895 with 4M bytes of randomaccess memory and a 200M-byte hard disk. A company could buy such a machine and an off-brand 386 system for less than the price of one 486-upgraded AST Premium.

DAVIDS. VEALE

ready have on the 386 machine will be incompatible with the 486. While the 486 will usually ignore the existing external cache system entirely, this is nevertheless a waste of a potential performance enhancer. It also means that another premium-priced component of the existing system is wasted.

If you choose this upgrade route, you increase only processor efficiency, not clock speed. Thus, if you want to eventually have the equivalent of a 25-MHz 486, you need to start with a 25-MHz 386-

based system.

If you put a 486 chip into a 386 machine with a slower clock speed, the new processor will be too fast for existing components. The computer will not boot properly, and even if it does, it will probably crash.

Strange behavior

One last problem you may encounter is some strange behavior from existing devices because of timing changes.

When a manufacturer of video cards

upgraded its 25-MHz 386 to a 486 machine, the processor changed the system timing in such a way that it adversely affected the video performance of the machine, resulting in a 30% drop in overall performance.

Timing problems should not be an issue much longer, as peripheral manufacturers can modify the design of their products to accommodate 486-specific issues.

The other way to upgrade is to choose an upgradable machine, such as Compaq Computer Corp.'s Systempro, IBM's Personal System/2 Model 70, AST Research, Inc.'s Premium and Advanced Logic Research, Inc.'s Powerveisa. These machines come with a 386 processor that can be replaced with a 486.

Some, such as the Systempro, are also

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This application heralds the introduction of a new concept in network management called the NYNEX ALLINK Network Management Solution. It will become a seamless, integrated network

designed to support multiple 386 or 486 processors.

With these upgradable machines, the upgrade is simple and, unlike third-party upgrades, is supported by the vendor. In addition, you can increase both clock speed and processing speed.

Costly configuration

While some of these upgradable systems provide a growth path, their very configuration can make that path expensive.

Many of the manufacturers put the processor and at least some of the memory on an expansion card, not on the system board, as in more standard systems. The expansion board is removable and replaceable, but only with a board produced by the manufacturer.

In addition, there is the question of what to do with the 386 card, which will work only in the make and model of the original machine.

With the exception of the PS/2 Model 70, there is a premium to be paid for buying a 386-based system now and upgrading later. ALR's Powerveisa 33-MHz 386 machine has a base price of about \$3,500. The 386 processor card can be replaced with a 25-MHz 486 card for \$1,995 (including a \$200 credit for returning your 386 card). The entire procedure ends up being about \$1,500 more expensive than initially buying the 486 version of the machine.

At \$3,195, a 33-MHz upgrade costs substantially more. AST's path is even more expensive. The Premium comes

with a 16-MHz 80386SX on an expansion card for about \$2,700 — with no hard

The 25-MHz 486 upgrade card costs a whopping \$7,695. A 33-MHz 486 upgrade adds up to \$4,195, which is about \$3,500 more expensive than buying the 33-MHz 486 AST Premium in the first place.

The one bargain here is the PS/2 Model 70. The 25-MHz 386 version sells for about \$9,000, which includes a 120M-byte hard disk. The 486 upgrade costs \$3,500, bringing the system's price to \$12,500. An equivalent Model 70 with a 486 costs \$13,000.

Veale is the PC coordinator for IDG Communications/Peterborough, Inc.

ASK THE VENDOR

We recently started using the Micro Frame 486M board, which has just eight alots. Is there any way we can increase the number of slots?

Gary Archibald President SBS Dataproducts Denver

MONOLITHIC SYSTEMS CORP.: One, you could move to the Micro Frame 486 EX, a 14-slot Intel I486-based EISA motherboard, which accepts AT-style boards. Or you could keep using the eight-slot board but free up some of the slots by installing the Micro Paq 452 VGA multifunction card. It consolidates functions that normally would take up three separate slots.

We have a Compaq Computer Corp. 386/25 server running SCO Unix connected to 40 workstations with Corollary's 8 x 4 multiport subsystem. How difficult would it be to convert to a multiprocessing system?

David Taylor Planning Program Coordinator Department of Planning Tucson, Ariz.

COROLLARY, INC.: The multiprocessor version of SCO Unix — called SCO MPX — was designed by Corollary to be 100% compatible with the single-processor version of SCO Unix. Compatibility is preserved for the device drivers, applications, data and file systems.

tran 386 compiler and have a
486 version on order. What is
the difference between the
386, 1486 and 1860 compilers?
James Cutler
Operations Manager
Dynamic Matrix Control Corp.
Houston

We use Microway's NDP For-

MICROWAY, INC.: Microway's 1860 compiler can be used as a cross compiler and native compiler with a proprietary tool chain (assembler, linker, loader and debugger), which operates against COFF formatted files. You need a DOS extender to run the compiler.

Intel's 80386 or 1486 compilers are native compilers that support multiple tool chains. Phar Lap Software, Inc. and Intel OMF files are supported, and a DOS extender is needed to run the application.

The I860 numeric coprocessor supports multiple operations on a single chip. You would need an Intel 80387 or a Weitek 3167/4167 to achieve the same functionality on the 386 and I486, respectively.

the 386 and I486, respectively.

The I860 is up to 300% faster than the 386 and I486 in selected numeric-intensive applications. But in terms of price, the 386 or I486 plus numeric coprocessor solution is about one-third that of the I860.

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1800 N.W. 169th Place Beaverton, OR 97006 (503) 629–2082

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2545 Tarpley Road Carrollton, TX 75006 (214) 416-0103

264 Passaic Avenue Fairfield, NJ 07006 (201) 882–4999

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The Storage Alternative

486-based machines

COMPANY	PRODUCT NAME	CLOCK SPEED (MHz)	OPERATING SYSTEMS SUPPORTED	BUS ARCHITECTURE	COPROCESSOR SUPPORT	MEMORY CACHE	CACHE CONTROLLER	RAM: STANDARD/MAXIMUM	FLOPPY DRIVE	HARD DRIVE: STANDARD/ MAXIMUM	CONTROLLER	STORAGE BAYS: HALF HEIGHT/ FULL HEIGHT	GRAPHICS STANDARD	NUMBER OF SERIAL/ PARALLEL PORTS	NUMBER AND TYPE OF EXPANSION SLOTS	DIMENSIONS (IN.)	PRICE
Acer America Corp. (408) 922-0333	Acer 1200	25	DOS, Microsoft	EISA	Weitek 4167, built	8K, 128K	lintel 82385	4M/64M	One 5.%-in. 1.2M	None	BOI	Piece Sili-in.	None	2/1	Eight 32-bit	6.3 x 20.9 x 16.5	\$9,995
	Acer 1170	25	Windows DOS, Microsoft Witstown	ISA	Weitek 4167, built into 1486	8K	Internal cache only	4M/64M	One 3%-in. 1.44M	None	IDE	Four IVs-in.	None	2/1	Four 16-bit	5x14.2x16.2	\$5,996
Advanced Logic Research, Inc. (714) 581-6770, (800) 444-4257	Powercache 33/4 Models 120, 330H, 660H	33	DOS 3.3, 4.01, OS/2, Unix, Xenix	MCA	Built into 1486	8K, 128K	Proprietary	8M/32M	One 31/1-in. 1.44M	120M (Model 120), 330M (Model 330H and 660H)	ESDI (Model 330H), ESDI and SCSI	2/2 and one 3½-in. (Models 330 and 660), four 3½-in. (Model 120)	Optional VGA	1/1	Four 16-bit, two 32-bit, one 64-bit proprietary	(Model 120), 23 x 7.4 x 17.5 (Models 330	\$11,690 (Model 120), \$15,690 (Model 330H), \$17,690 (Model 660H)
	Powercache 4 Models 120, 150, 340H, 650H	25	DOS 3.3, 4.01, OS/2, Unix, Xenix	MCA	Built into 1486	8K, 128K	Proprietary	8M/32M	One 3½-in. 1.44M	120M (Model 120), 150M (Model 150), 340M (Model 340H), 650M (Model 650H)	ESDI	NP	Optional VGA	1/1	Four 16-bit, two 32-bit, one 64-bit proprietary	(tower), 6 x 15 x 17 (desktop)	\$9,690 (Model 120), \$11,190 (Model 150), \$14,190 (Model 340H), \$16,190 (Model 650H)
	Powercache 4e Models 150, 340H, 650H	25	DOS 3.3, 4.01, OS/2, Unix, Xenix	EISA	Weitek 4167, built into I486	8K, 128K	Proprietary	8M/ 128M	One 3½-in. 1.44M	150M (Model 150), 340M (Model 340H), 650M (Model 650H)	ESDI	2/2 and one 3½-in.	VGA	1/1	One 8-bit ISA, four 16-bit, two 32-bit EISA, one 64- bit proprietary	23 x 7.4 x 17.5	\$11,490 (Model 150), \$14,490 (Model 340H), \$16,490 (Model 650H)
	Powerveisa 486/33 Models 80, 110, 150, 330	33	DOS 3.3, 4.01, OS/2, Unix, Xenix	EISA	Intel 80387, Weitek 4167, built into I486	8K, 64K	Proprietary	5M/49M	One 5%-in. 1.2M	80M (Model 80), 106M (Model 110), 150M (Model 150), 330M (Model 330)	IDE, ESDI	2/2 and one 31/4-in.	Optional VGA	1/1	One 8-bit ISA, two 16-bit ISA, three 32- bit EISA, three 32-bit proprietary		\$8,495 (Model 80) \$8,695 (Model 110), \$10,495 (Model 150), \$12,495 (Model 330)
	Powerveisa 486/25 Models 80, 110, 150, 330	25	DOS 3.3, 4.01, OS/2, Unix, Xenix	EISA	Intel 80387, Weitek 4167, built into I486	8K, 64K	Proprietary	5M/49M	One 5¼-in. 1.2M	80M (Model 80), 106M (Model 110), 150M (Model 150), 330M (Model 330)	IDE, ESDI	2/2 and one 3½-in.	Optional VGA	1/1		23 x 7.4 x 17.5	\$7,495 (Model 80) \$7,695 (Model 110), \$9,495 (Model 150), \$11,495 (Model 330)
	Businessveisa 486/25 Models 1, 40, 50, 110	25 or 33	DOS 3.3, 4.01, OS/2, Unix, Xenix	EISA	Intel 80387, Weitek 4167, built into I486	8K	Internal cache only	2M/49M	One 5%-in. 1.2M (Model 1), 3½-in. 1.44M	None (Model 1), 40M (Model 40), 80M (Model 50), 106M (Model 110)	IDE	4/2 31/2-in.	Optional Super VGA	1/1	One 8-bit ISA, two 16-bit ISA, three 32- bit EISA, three 32-bit proprietary	6 x 15 x 17	\$4,999 (Model 1), \$6,599 (Model 40 \$6,999 (Model 80 \$7,199 (Model 11
	Powerflex (upgradable 286 machine)	25	DOS 3.3, 4.01, OS/2, Unix, Xenix	EISA	Built into I486	8K	Internal cache only	1M/16M	One 31/s-in. 1.44M	None	NA	2/2 3½-in.	None	1/1	One 8-bit, five 16-bit	6 x 15 x 17	\$1,495 for machin \$1,995 for 486 upgrade board
AGI Computer, Inc. (415) 683-2357	Model 4000A (desktop), Model 4100A (upright)	25	DOS 3.3, 4.01	ISA	Weitek 4167, built into I486	8K, 64K, expand- able to 256K	Proprietary	4M/16M	One 51/4-in. 1.2M	None	NA	5/0 (desktop), 4/2 (upright)	None	1/1	One 8-bit, six 16-bit, one 32- bit proprietary	6.5 x 21.2 x 16.5 (deak- top), 25.5 x 7 x 18 (upright)	\$7,994 (desktop), \$8,594 (upright)
Altos Computer Systems (408) 432-6200	Altos Multiuser System 5000	25	Altos Unix System V/386	EISA	Built into I486	8K, 128K	Proprietary	8M/64M	One 5¼-in. 1.2M and one 3½-in. 1.44M	440M/29G	SCSI	5/0	VGA plus	2/1	Eight 32-bit	26.5 x 8 x 19	\$25,000 (440M), \$40,000 (two 440M)
Arche Technologies, Inc. (800) 422-4674	Arche Pro-File 486-33	33	DOS 3.3, 4.01, Unix, Xenix	ISA	Weitek 4167, built into I486	8K, 256K	Proprietary	4M/64M	One 5¼-in. 1.2M, optional one 3½-in. 1.44M	Optional 20M/760M	MFM, optional ESDI, RLL, SCSI, ST 506/412	Two 5¼-in., two 3½- in./two 5¼-in.	Mono- chrome	2/1	Two 8-bit, six 16/8-bit	19.5 x 5.5 x 24	\$9,695
	Arche Legacy 486	25	DOS 3.3, 4.01, Unix, Xenix	ISA	Weitek 4167, buit into 1486	8K, 256K	Proprietary	4M/64M	One 5¼-in., 1.2M, optional one 3½-in. 1.44M	Optional 20M/760M	MFM, optional ESDI, SCSI	5/0	Mono- chrome	2/1	Two 8-bit, aix 16-bit	6.25 x 21 x 16.25	\$8,995
	Arche Legacy 486-33E	33	DOS 3.3, 4.01, Unix, Xenix	EISA	Weitek 4167, built into I486	8K, 256K	Proprietary	4M/64M	One 5¼-in., 1.2M, optional one 3½-in. 1.44M	Optional 20M/760M	MFM, optional ESDI, RLL, SCSI, ST 506/412	5/0	Mono- chrome	2/1	Four 32-bit EISA, two 8- bit	19.5×5.5×24	\$10,495
	Arche Legacy 486-33	33	DOS 3.3, 4.01, Unix, Xenix	ISA	Weitek 4167, built into I486	8K, 256K	Proprietary	4M/64M		Optional 20M/760M	MFM, optional ESDI, RLL, SCSI, ST 506/412	Five 5%-in./0	Mono- chrome	2/1	Two 8-bit, six 16-bit	19.5 x 5.5 x 24	\$9,495
AST Research, Inc. (714) 727-4141	Premium 486/33E Model 115, Model 325	33	DOS 3.3, 4.01 OS/2, Unix, Xenix	EISA	Intel 80387, Weitek 4167, built into I486	8K	Internal cache only	4M/48M		110M/320M	AT- embedded, ESDI	5/0	None	2/1	Four 16-bit, three 16/32- bit	6.25 x 19.25 x 16.5	\$12,545 (110M), \$14,245 (320M)
	Premium 486/33 Model 5	33	DOS 3.3, 4.01, OS/2, Unix, Xenix	ISA	Intel 80387. Weitek 4167, built into I486	8K	Internal cache only		1.2M	None	NA	5/0	None	2/1	three 16/32- bit	6.25 x 19.25 x 16.5	
	Premium 486/33 Model 115, Model 320	33	DOS 3.3, 4.01, OS/2, Unix, Xenix	ISA	Intel 80387, Weitek 4167, built into I486	8K	Internal cache only	4M/48M	One 5%-in. 1.2M	110M/320M	IDE, ESDI	5/0	None	2/1	Four 16-bit, three 16/32- bit	6.25 x 19.25 x 16.5	\$11,495 (110M), \$13,645 (320M)

¹⁴⁸⁶ chip already has a built-in coprocessor.

²¹⁴⁸⁶ chip includes 8K of on-chip cache.

The companies included in this chart responded to a recent survey conducted by *Computerworld*. When a vendor is unable to provide specific information about its product, the abbreviation NP (not applicable) is used. When a question does not apply to a vendor's product, the abbreviation NA (not applicable) is used. Further product information is available from the vendors.

HIGH-PERFORMANCE PCs

PRODUCT SPOTLIGHT

OMPANY	PRODUCT NAME	CLOCK SPEED (MHz)	OPERATING SYSTEMS SUPPORTED	BUS ARCHITECTURE	COPROCESSOR SUPPORT	MEMORY CACHE?	CACHE CONTROLLER	RAM: STANDARD/MAXIMUM	FLOPPY DRIVE	HARD DRIVE: STANDARD/ MAXIMUM	CONTROLLER	STORAGE BAYS: HALF HEIGHT/ FULL HEIGHT	GRAPHICS STANDARD	NUMBER OF SERIAL/ PARALLEL PORTS	NUMBER AND TYPE OF EXPANSION SLOTS	DIMENSIONS (IN.)	PRICE
AST Research, Inc. (714) 727-4141	Premit 3 486/33TE Model 5	33	DOS 3.3, 4.01, OS/2, Unix, Xenix	EISA	80387,	8K, ex- pandable to 128K	Proprietary		One 5¼-in. 1.2M	None	NA	6/0	None	2/1	Seven 16-bit EISA, three 16/32-bit	24.25 x 14 x 17.9	\$11,995
	Premium 486/33TE Model 325, Model 665, Model 1005	33	DOS 3.3, 4.01, OS/2, Unix, Xenix	EISA	80387.	8K, ex- pandable to 128K	Proprietary			320M, 660M, 1G	SCSI	6/0	None	2/1	Seven 16-bit EISA, three 16/32-bit	24.25 x 14 x 17.9	\$15,895 (320M), \$17,195 (660M), \$19,995 (1G)
Blackship Computer Systems, Inc. (415) 770-9300	Blackship	25	DOS 4.01	ISA	4167, built into 1486	8K, 64K, expand- able to 256K	Proprietary	1M/16M	One 5¼-in. 1.2M		MFM, ESDI, RLL, SCSI, Western Digital 1007	5/0	VGA	2/1	Eight 16-bit	6.5 x 16.5 x 21	\$5,495 (158M)
Blue Dolphin Computers (800) 345-0633	BDC 486-25	25	DOS 3.3, 4.01	ISA	Built into 1486	8K, 128K	Intel chip set	1M/16M		50M/ Unlimit- ed	IDE	4/0	Paradise, Super VGA	2/1	Two 8-bit, five 16-bit, one 32- bit	7 x 16 x 14	\$3,899 (50M)
C ² Micro Systems (415) 683-8888	Cº 486L	25	DOS 4.01	ISA	4167, built	optional	only, optional	2M/32M		44M/675M	IDE	5/2	None	2/1	Eight 16-bit	6.5 x 21 x 17	\$4.195 (44M)
Cache Computers, Inc. (415) 226-9922	Cache 486- 25/AT. Cache 486-33/AT	25 or 33	DOS 3.3, 4.01, SCO Unix, Interactive Systems' Unix System V	ISA	into 1486	128K	Proprietary Proprietary		One 5%-in. 1.2M or 3½- in. 1.44M	110M/700M	ESDI	4/2	VGA	2/1	Two 8-bit, six 16-bit	2.5 x 7 x 16	\$4,990 (147M)
CCS Custom Computer Systems, Inc. (201) 729-6762	CCS 486-25c Model J4VMW	25	DOS 4.01	EISA	Westek 4167	8K, 128K	Proprietary	4M/32M	One 5.25-m. 1.2M, one 3.5- m. 1.44M	212M/four 778M	SCSI	12/0	VGA	2/2	One 8-bit, one 16-bit, six 32- bit-EISA	31 x 10 x 26	\$10,000 (212M)
Cheetah International, Inc. (214) 757-3001, (800) 243-3824	Cheetah Gold 425, Cheetah Gold 433	25 or 33	DR DOS 5.0	ISA	Built into 1486	8K	Internal cache only	8M/16M		60M/1.2G	ESDI, RLL., SCSI	8/0	VGA	2/2	One 8-bit, seven 16-bit	24 x 7.63 x 22.5	\$5,995 (60M). \$9,995 (383M)
Club American Technologies, Inc. (415) 683-6600	Hawk II	25	DOS 3.3, 4.01, OS/2, Unix, Xenix	ISA	4167, built into I486	8K, 64K, expand- able to 256K	Proprietary		1.2M	71M/651M	MFM	8/3	VGA	1/1	One 8-bit, six 16-bit, one 32- bit	25 x 7 x 18.5	\$4,995 (71M)
	Hawk III	33	DOS 3.3, 4.01, OS/2, Unix, Xenix	ISA		8K, 64K, expand- able to	Proprietary	4M/16M	One 5¼-in. 1.2M	71M/651M	MFM	8/3	VGA	2/1	One 8-bit, six 16-bit, one 32- bit	25 x 7 x 18.5	\$7.995 (71M)
Compaq Computer Corp. (713) 374-4816	Deskpro 486/25 Model 120	25	DOS 3.3, 4.01, OS/2	EISA	Intel 80387, socket for Weitek 4167, built into I486	256K 8K, 128K	Proprietary	4M/ 100M	One 5%-in. 1.2M	120M	Integrated	4/3, 1/3 height	VGA	1/1	One 32-bit, aeven 8/16/32-bit EISA	6.5 x 19.2 x 17.7	\$13,999 (120M)
	Deskpro 486/25 Model 320	25	DOS 3.3, 4.01, OS/2	EISA	Intel 80387, socket for Weitek 4167, built	8K, 128K	Proprietary	4M/ 100M	One 5%-in. 1.2M	320M	ESDI	4/3, 1/3 height	VGA	1/1	One 32-bit, seven 8/16/32-bit EZSA	6.5 x 19.2 x 17.7	\$17,499 (320M)
	Deskpro 486/25 Model 650	25	DOS 3.3, 4.01, OS/2	EISA	Intel 80387, socket for Weitek 4167, built into E886	8K, 128K	Proprietary	4M/ 100M	One 5¼-in. 1.2M	650M	ESDI	4/3, 1/3 height	VGA	1/1	One 32-bit, seven 8/16/32-bit EISA	6.5 x 19.2 x 17.7	\$20,499 (650M
Compuadd Corp. (800) 456-3116	Compuadd 425	25	DOS 4.01, Microsoft Windows 3.0	ISA	Built into I486	8K	Internal cache only	4M/16M	One 5%-in. 1.2M or one 3½-in. 1.44M	80M	IDE	3/0	VGA	2/1	Two 8-bit, three 16-bit	4.13 x 16.25 x 15.5	\$4,995 (80M)
Copam USA, Inc. (415) 623-8911	PC 486V/25 EISA	25	DOS 3.3, 4.01	EISA	Built into 1486	8K, optional 64K	Internal cache only, optional proprietary	2M/32M	One 5.25-in. 1.2M	Optional 111M/700M	IDE, proprietary intelligent 32- bit EISA	3/2	Optional VGA	2/1	Two 16-bit, six 32-bit	27.3 x 6.5 x 19.1	\$5,699, \$6,799 (111M)
CSS Laboratories (714) 852-8161	Max Sys 486T/25	25	DOS 3.3, OS/2, Unix	ISA	Socket for Weitek 4167, built into I486	8K	Internal cache only		One 5%-in. 1.2M	106M/1.2G	ESDI, optional SCSI		None	2/1	Two 8-bit, eight 16-bit, two 32-bit		\$8,999 (106M)
	Max Sys 486MT/25 Max Sys	25	DOS 3.3, OS/2, Unix	ISA	Socket for Weitek 4167, built into I486 Socket for	8K	Internal cache only		One 5¼-in. 1.2M	106M/1.2G	ESDI, optional SCSI	10/5	None	2/1	Two 8-bit, eight 16-bit, two 32-bit		\$8,079 (106M) \$9,572 (106M)
Patamadia C	486T/33		OS/2, Unix		Weitek 4167, built into I486		only		1.2M						eight 16-bit, two 32-bit		
Datamedia Corp. (603) 886-1570	Netmate/DX 425-00	25	DOS 3.3, 4.01, OS/2, Unix	ISA	Built into 1486	8K	Internal cache only	+MJ20M	None	None	NA	Two 1/3 height	VGA	1/1	Three 16-bit, one 32-bit	15.2 x 14.5 x 4.5	\$7,695
	Netmate/DX 425-01	25	DOS 3.3, 4.01, OS/2, Unust	36A	Built into [486	8K	Internal cache only		1.44M	None	NA	Two 1/3 height	VGA	1/1	Three 16-bit, one 32-bit	4.5	
	Netmate/DX 425-A0	25	DOS 3.3, 4.01, OS/2, Unix	ISA	Built into 1486	att	Internal cache only		1.44M	100M	IDE	Two 1/3 height	VGA	1/1	Three 16-bit, one 32-bit	4.5	
Dell Computer Corp. (512) 338-4400	Dell System 425E	25	DOS 3.3, 4.01, OS/2, Unix	EISA	Socket for Weitek 4167, built into I486		only		One 5¼-in. 1.2M or one 3½-in. 1.44M		ESDI, IDE	5/2	VGA	2/1	Two 16-bit ISA, six 32-bi EISA		\$7,899 (80M)
Digital Distributing, In (401)885-6697	c. 486-Executow	25 or 33	DOS 4.01, OS/2, Unix System V	ISA (25MHz), EISA (33MHz)	Weitek 4167, built into \$486	8K, 128l (25MHz) 8K, 256l (33MHz)	K	(25MHz)	One 5.25-in. 1.2M, one 3.5 in. 1.44M	85M/7G	SCSI	5/0	Super VGA	2/1	Eight 16-bit	16 x 10 x 17.5	5 \$6,792 (25MH 85M), \$6,792 (33MHz, 85M)

PRODUCT SPOTLIGHT

OMPANY	PRODUCT NAME	CLOCK SPEED (MHz)	OPERATING SYSTEMS SUPPORTED	BUS ARCHITECTURE	COPROCESSOR SUPPORT	MEMORY CACHE?	CACHE CONTROLLER	RAM: STANDARD/MAXIMUM	FLOPPY DRIVE	HARD DRIVE: STANDARD/ MAXIMUM	CONTROLLER	STORAGE BAYS: HALF HEIGHT/ FULL HEIGHT	GRAPHICS STANDARD	NUMBER OF SERIAL/ PARALLEL PORTS	NUMBER AND TYPE OF EXPANSION SLOTS	DIMENSIONS (IN.)	PRICE
Dolch Computer Systems (408) 435-1881	P.A.C. 486-25	25	DOS 4.01	ISA	Weitek 4167, built into I486	8K	Internal cache only	2M/16M	One 3½-in. 1.44M	100M/200M	IDE	2/0	VGA	1/1	One 8-bit, two 16-bit	16 x 9.5 x 7.8	\$12,995
DTK Computer, Inc. (818) 333-7533	Feat-2502	25	DOS, OS/2, SCO Unix, Xenix	NP	Weitek 4167		Internal cache only	8M/16M	None	None	NA	7/0	None	None	One 8-bit, six 16-bit, one 32-	19×7×6	\$5,251
Dyna Micro, Inc. (408) 943-0100	Dyna Work Master 486 25 (color)	25	DOS 3.3, 4.01	ISA	Built into 1486	8K, 128K	NP	8M/16M	One 5%-in. 1.2M, one 3%- in. 1.44M	Optional 106M/2.5G	ESDI	6/0	Super VGA	1/1	Two 8-bit, five 16-bit, one 32-	25 x 9.5 x 18.75	\$5,895
Everex Systems, Inc. (415) 683-2246	Step 486IS	25	DOS 3.3, 4.01, OS/2, Esix System V	ISA	Built into I486	8K, 64K, expand- able to 256K	Proprietary	4M/16M	One 5%-in. 1.2M	Optional 330M	Everex ESDI	5/0	None	1/1	Two 8-bit, six 16-bit	6 x 21 x 16	\$8,999
	Step 486/25	25	DOS 3.3, 4.01, OS/2, Esix System V	ISA	Weitek 4167, built into I486		Proprietary	4M/64M	One 5¼-in. 1.2M	Optional 330M	Everex ESDI	5/0	None	2/1	One 8-bit, six 16-bit, one 32- bit	6 x 21 x 16	\$8,999
	Step 486/33	33	DOS 3.3, 4.01, OS/2, Esix System V	ISA	Weitek 4167, built into I486	8K, 128K	Proprietary	4M/64M	One 5¼-in. 1.2M	Optional 330M	Everex ESDI	5/0	None	2/1	One 8-bit, six 16-bit, one 32-	6 x 21 x 16	\$10,499
Grid Systems Corp. (413) 656-4710	Grid 486E3-25	25	DOS, OS/2, SCO Xenix	EISA	Built into 1486	8K	Internal racini only	2M/64M	One 3½-in. 1.445d	Optional 20M/1G	IDE, optional ESDI, SCSI, ST-506	3/0	Super VGA	1/1	Six 32-bit EISA	6.25 x 17 x 15.75	\$8,999
Hewlett-Packard Co. (800) 752-0900	HP Vectra 485	25	DOS 4.01, OS/2, SCO Unix System V	EISA	Intel 80387, built into I486	8K	Internal cache only	2M/64M	One 5¼-in. 1.2M	Optional 150M/two 670M	ESDI	6/0	Optional VGA, Super VGA, IGC	2/1	Eight 32/16/8-bit EISA	24 x 8.3 x 20	\$10,499
IBM (800) 425-2468	Personal System/2 Model 70 486	25	DOS 3.3, 4.0, OS/2, SCO Unix/386, ADX PS/2 1.2		Integrated floating- point unit, built into 1486	8K	Internal cache only	2M/16M	One 3½-in. 1.44M	60M/120M	ESDI	3/0	VGA	1/1	One 16-bit, two 32-bit	5.5 x 14.2 x 16.5	\$12,390 (60M), \$12,990 (120M)
Kontron Elektronik (408) 733-0272, (800) 227-8834	IP Lite 486 portable industrial computer	25 or 33	DOS 4.0, OS/2, Interactive Systems' Unix	EISA, passive backplane	Built into	8K	Internal cache only	2M/16M	One 3½-in., 1.44M	40M/200M	SCSI	2/0	VGA	2/1	Five 32-bit- EISA	5 x 15.7 x 18.1	Price unannounced
Logicraft, Inc. 1693) 880-0390	486Ware	25	System V DOS 3.3	AT	Built into 1486	8K	Internal cache only	4M/16M	One 5.25-in. 1.2M	Optional 179M/702M	ESDI	3/1	CGA, Hercules	2/1	One 8-bit, three 16-bit	6.5 x 21.1 x 16.6	\$17,895
Metra Information Systems, Inc. (408) 730-9188	MIS 486	25	DOS 4.01	ISA	Weitek 4167, built into I486	8K, 64K	Proprietary	1M/16M	One 5¼-in. 1,2M	43M/600M	IDE	5/0	None	2/1	Eight 16-bit	6 x 21 x 6.5 (desktop), 24 x 7 x 16 (tower)	\$3,795 (43M)
(408) 730-9188	MIS 486/E	25	DOS 4.01	EISA	Weitek 4167, built into 1486	8K, 64M	Proprietary	1M/64M	One 5¼-in. 1.2M	43M/600M	IDE	5/0	None	2/1	Eight 32-bit	6 x 21 x 6.5 (desktop), 24 x 7 x 16 (tower)	\$4,295 (43M)
Micro Express (714) 852-1400, (800) 642-7621	ME 486-ISA	25	DOS 3.3, 4.01, Unix	ISA	Western 4167, built irms 1486	8K, 128K	Proprietary	4M/24M	One 5¼-in. 1.2M or one 3½-in. 1.44M	Optional 40M, 750M	Any available	6 or 2 half- height and 2 hull height	VGA	1/1	One 8-bit, six 16-bit, one 32-	22.5 x 7 x 16	\$3,999
Mitsuba Corp. (714) 592-2866	MIT-486	25	DOS, OS/2, PC-MOS, hdarrossell Windows, Xenix, Unix	AT	Weitek 4167, built into I486	8K, 64K	Intel chip set	4M/16M	One 5¼-in. 1.2M or one 3½-in. 1.44M	Optional 40M/330M	DTC 728, DTC 6280	Two 5¼-in., two 3½-in./one 5¼-in. (tower); three 5¼-in./one 5¼-in (AT ease)	None	2/1	Two 8-bit, six 16-bit	6 x 21 x 16.5	NP
Mohius Computer Corp. 18000 662-4871	PWS/425	25	Interactive Systems' Unix System V	ISA	Weitek 4167, built into I486	Ж	Internal cache imbi	4M/16M	One 3½-in. 1.2M or 1.44M	105M/700M	SCSI	4/6	None	2/1	Two 8-bit, five 16-bit, one 32- bit, one 32-bit burst mode	12 x 7 x 18	\$7,995 (105M)
	PWS/425C	25	Interactive Systems' Unix System V	ISA	Weitek 4167, built into 1486	alk	Internal cache only	4M/16M	One 3½-in. 1.2M or 1.44M	105M/700M	SCSI	4/0	Mobius worksta- tion graphics system	2/1	Two 8-bit, five 16-bit, one 32- bit, one 32-bit burst mode	12 x 7 x 18	\$9,995 (105M)
National Micro Systems, Inc. (404) 446-0520	Finsh 486-25	25	DOS 4.01	ISA	Built into 1486	8K, 128K	Proprietary	4M/16M	One 5.25-in. 1.2M	None	NA.	5/0	None	2/1	One 8-bit, six 16-bit, one 32	6.38 x 21.13 : 16.5	\$4,499
NCR Corp. (800) 544-3333, (513) 445-5000	PC486/MC 33	33	DOS, 08/2, Unix	MCA	Weitek 4167, built into I486	8K	Internal cache only	4M/64M	One 3.5-in. 1.44M	100M/320M	SCSI	3/0	Super VGA	1/1	Four 32-bit	5.2 x 15 x 16.	6 \$14,195-\$26,09
200000	S486/MC 33	33	DOS, OS/2, Unix	MCA	Weitek 4167, built into I486	8K	Internal cache only	4M/64M	One 3.5-in. 1.44M	327M/600M	SCSI	6/3	Super VGA	2/1	Seven 32-bit	29 x 7.25 x 2	\$14,195
	PC486/MC	25	DOS, OS/2, Unix	MCA	Weitek 4167, built into I486	8K, 128K	Proprietary	2M/16M	One 3.5-in. 1.44M	100M/200M	SCSI	Three 3.5- in./0	Super VGA	1/1	Four 32-bit	5.2 x 15 x 16.	d \$9,995-\$16,995
NEC Technologies, Inc. (508) 264-8000	Power Mate 486/25E	25	DOS, OS/2, SCO Unix, Microsoft Windows/386	EISA, ISA	Optional Weitek 4167, built into I486	8K, optional 64K	Internal cache and optional proprietary	4M/64M	Five 5¼-in. 1.2M, or optional 1.44M	118M/600M	NEC EISA, SCSI	5¼-in./0	None	2/1	Two 16-bit, six 32-bit	6.3 x 21.2 x 17.7	\$12,999 (118M)
	Business Mate 486/25E	25	SCO Unix, Xenix	EISA, ISA	Optional Weitek 4167, built into I486	8K, optional 64K, ex- pandable to 256K	Internal cache and optional proprietary	4M/64M	5¼-in. 1.2M, or optional 1.44M	100M/300M	NEC EISA, SCSI	Three 51/4- in./0	None	2/1	Two 16-bit, six 32-bit	25.6 x 7.1 x 26.8	Price unannounc
Northgate Computer Systems, Inc. (800) 548-1983	Elegance/486	25	DOS 4.01	ISA	Weitek 4167, built into 1486	8K, 64K, expand- able to 256K	Proprietary	4M/16M	One 5¼-in. 1.2M, one 3¼ in. 1.44M	200M/1.2G	IDE	5/0 (desktop case), 7/0 (upright case)	VGA	2/1	One 8-bit, six 16-bit, one 32 bit	6.5 x 21 x 16. (desktop), 25.25 x 7.5 x 16.25 (upright)	\$5,895 (200M)
Novacor, Inc. (408) 441-6500, (800) 486-6482	Novas Optimum	25 or 33	DOS 3.3, 4.0, 4.01, Unix, Xenix	ISA	Weitek 4167, built into I486	8K, 64K, expand- able to 512K	Proprietary	64M	One 5¼-in. 1.2M, one 3½ in. 1.44M	100M/676M	Western Digital AT- 240, Adapted 2223B-8	6/2	Super VGA	2/1	Two 8-bit, six 16-bit, one 32	24 x 7.5 x 16	\$3,995 (100M)
Otec Technologies, Inc. (800) 346-2799	OTC 486-25X	25	DOS 3.3, 4.01, Unix, Xenix	ISA	Weitek 4167, built into I486		Proprietary	4M/24M	One 5%-in. 1.2M	Optional 40M/600M	ESDI, MFM	5/2	None	2/1	Two 8-bit, six 16-bit, one 32 bit	5.5 x 21 x 16.	5 \$6,295
	OTC 486-25C	25	DOS 3.3, 4.01, Unix, Xenix	ISA	Intel 80387, Weitek 4167, built into I486		Proprietary	434/1634	One 5%-in. 1.2M	Optional 40M/600M	ESDL MFM	5/2	None	2/1	1	5.5 x 21 x 16.	5 \$4,995

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HIGH-PERFORMANCE PCs

PRODUCT SPOTLIGHT

DMPANY	PRODUCT NAME	CLOCK SPEED (MHz)	OPERATING SYSTEMS SUPPORTED	BUS ARCHITECTURE	COPROCESSOR SUPPORT	MEMORY CACHE	CACHE CONTROLLER	RAM: STANDARD/MAXIMUM	FLOPPY DRIVE	HARD DRIVE: STANDARD/ MAXIMUM	CONTROLLER	STORAGE BAYS: HALF HEIGHT/ FULL HEIGHT	GRAPHICS STANDARD	NUMBER OF SERIAL/ PARALLEL PORTS	NUMBER AND TYPE OF EXPANSION SLOTS	DIMENSIONS (IN.)	PRICE
pedr Vecknology, Inc. 708: 880-7300	Super 486/25	25	DOS 3.3, 4.01, OS/2,	ISA, EISA	4167, built	8K, 128K	Proprietary	1M/24M	One 5.25-in.	72M/766M	MFM, RLL, ESDI, SCSI	3/1	VGA	2/1	Two 8-bit, six 16-bit, one 32-	24.5 x 7.5 x 16.75	\$5,195 (150M)
wan Technologies 800: 468-9044	Swan 486/25	25	Unix, Xenix DOS 4.01	ISA	Weitek 4167, built	8K, 64K, expand- able to 256K	Proprietary			Optional 1 110M/660M	GCSI, Adaptec 1542A	5/2	Optional Super VGA	2/1	Eight 16-bit	6.5 x 21 x 16.5	\$4,499
ymbionics, Inc. (513) 858-4994	SYM48625C	25	DOS 3.3, 4.01, PCMOS, OS/2, SCO Unix, Xenix	ISA			Proprietary		1.2M	Optional 80M/unlimi- ted	Any available	6/0	Optional mono- chrome, Super VGA	2/1	Two 8-bit, five 16-bit, one 32- bit	6 x 19 x 16 (desktop), 28 x 6.5 x 17 (tower)	\$3,359, \$4,955, (105M)
5, atrex, Inc. (201) 542-1500	Syntrex 486/33C	33	DOS 3.3. 4.01, Unix System V	ISA	Built into 1486	8K, 128K	Intel chip set	4M/32M	1.2M	150M/four 660M	ESDI, SCSI, DCB, proprietary mirrored disk controller	3/4	None	4/2	One 8-bit, nine 16-bit	24.5 x 15 x 22	\$15,999 (150M)
	Syntrex 486/25C	25	DOS 3.3, 4.01, Unix System V	ISA	Built into 1486	8K, 128K	Intel chip set		One 5¼-in. 1.2M	Optional 150M/four 660M	ESDI, SCSI, DCB, proprietary mirrored disk	3/4	None	4/2	One 8-bit, nine 16-bit	24.5 x 15 x 22	\$14,999 (150M)
Systems Integration Associates	SIA Model 486/25C	25	DOS 3.3, OS/2, SCO	ISA	Wessek 4167, built	8K, 64K	Proprietary	4M/16M	One 5¼-in. 1.2M		controller 2322 B	10/or 5	None	1/1	16-bit, one 32-	6.5 x 21 x 16.5	\$6,561 (90M)
(312) 440-1275	(convertible) SIA Modei 486/25	25	Unix, Xenix DOS 3.3, OS/2, SCO	ISA	into [486 Western 4167, built	8K, 128K	Proprietary	4M/24M	One 5¼-in. 1.2M	150M/1.2G	2322 B	10/or 5	None	1/1	16-bit, one 32-	24.5 x 9 x 23.5	\$8,690 (150M)
	SIX Model 486/25E	25	Unix, Xenix DOS 3.3, OS/2, SCO Unix, Xenix	EISA	into I486 Wester 4167, built into I486	8K, 256K, expand- able to	Proprietary	4M/96M	One 5%-in. 1.2M	150M/1.2G	2322 B	10/or 5	None	1/1	bit	24.5 x 9 x 23.5	\$9,866 (150M)
	SIA Model 486/33C	33	DOS 3.3, OS/2, SCO	ISA	Wessers 4167, built	512K 8K, 64K	Proprietary	4M/16M	One 5¼-in. 1.2M	150M/1.2G	2322 F	10/or 5	None	1/1	One 8-bit, six 16-bit, one 32-	24.5 x 9 x 23.5	\$8,801 (150M)
	(convertible) 51A Model 486/33	33	Unix, Xenix DOS 3.3, OS/2, SCO	ISA	into I486 Western 4167, built	8K, 128K	Proprietary	4M/24M	One 5¼-in. 1.2M	150M/1.2G	2322 B	10/or 5	None	1/1	One 8-bit, six 16-bit, one 32-	24.5 x 9 x 23.5	\$10,454 (150M)
	SIA Model 486/33E	33	Unix, Xenix DOS 3.3, OS/2, SCO Unix, Xenix	EISA	Mentrick 4167, built into 1486	8K, 256K, expand- able to	Proprietary	4M/96M	One 5¼-in. 1.2M	150M/1.2G	2322 B	10/or 5	None	1/1	One 8-bit, one 32-bit, six 32- bit EISA	24.5 x 9 x 23.5	\$11,043 (150M)
Tandon Corp. (805) 523-0340	Tandon 486	25	DOS 4.01, OS/2, Unix	EISA	Weitek 4167, built	512K 8K, 64K	Proprietary	2M/64M	One 5%-in. 1.2M	Optional 110/670M	IDE, SCSI	5/2	Optional Super	2/1	Two 16-bit, six-32-bit	6.3 x 21.1 x 16.3	\$6,599 (110M)
Tatung Co. of America, Inc. (213) 979-7055	TCS 9270	25	DOS, OS/2, Unix, Xenix	MCA	into I486 Intel 80387- compatible, built into	8K, 64K	Faraday chip set	4M/64M	One 5%-in. 1.2M	Optional 100M	ESDI	3/1	VGA	2/1	One 16-bit, three 32-bit	6.38 x 21.25 x 17.32	\$6,400
	TCS 9600E	25	DOS, OS/2, Unix, Xenix	EISA	1486 Weitek 4167, Intel 80387, built into 1486	8K, 64K, expand- able to 128K	Intel chip set	2M/64M	One 5¼-in. 1.2M	Optional 100M	SCSI	3/1	VGA	2/1	One 16-bit, three 32-bit	6.38 x 21.25 x 17.32	\$6,500
Telecad (Div. of DMS) (415) 352-9322	Rocket 486	25	DOS 3.3, 4.01, OS/2, Unix, Xenix	ISA	Weitek 4167, Intel 80387, buil into 1486	8K, 64K, expand- able to 256K	Proprietary	8M/16M	One 5¼-in. 1.2M	330M/660M	ESDI	5/0	None	2/1	Eight 16-bit	24.75 x 16 x 7 (tower)	\$8,299 (330M)
Televideo Systems, Inc. (488) 954-8311	Tele 486	25	DOS 4.01	EISA	Western 4167, built into 1486	8K, spinoral 64K, ex- paredable to 256K	Proprietary	4M/64M	One 5¼-in. 1.2M or 3½- in. 1.44M	Optional 110M/320M	SCSI	5/1	VGA, optional Super VGA	2/1	Seven 32-bit EISA/ISA	6.4 x 16.5 x 16.5 (desktop)	\$8,995
	Tele 486 TE	33	DOS 4.01	EISA	Weitek 4167, built into I486	8K, optional 64K, ex- pandable to 256K	Proprietary	4M/64M	One 51/4-in. 1.2M	Optional 320M	SCSI	3/2	VGA, optional Super VGA	2/1	Seven 32-bit EISA/ISA	25.6 x 17.8 x 7.5 (tower)	\$10,995
TMC Research Corp. (408) 262-0888	Vantage 425 Model 200	25	DOS, OS/2, SCO Unix, Microsoft Windows/38	ISA 5	Built into 1486		Proprietary	4M/16M	One 5%-in. 1.2M and one 3%-in. 1.44M	200M/300M	IDE	2/or i	VGA	2/1	One 8-bit, five 16-bit, two 32-bit	6.5 x 21 x 17	\$4,966 (200M)
Tricord Systems, Inc. (612) 557-9005	Model 30, Model 40	25	OS/2, SCO Unix	EISA	Built into 1486	8K (Model 30), 64K (Model 40)	Proprietary	8M/ 256M	One 5%-in. 1.2M	380M/16G	SCSI	4/10	VGA	2/1	Seven 8-bit, seven 16-bit, seven 32-bit	30 x 20 x 27	\$27,900 (Model 380M), \$22,300 (Model 30, 380)
Twinhead Corp. (408) 945-0808	Superset 600/425	25	DOS 4.01	ISA	Weitek 3167, built into I486	8K, 64K		4M/16M	1.2M	100M/two 300M	IDE	Two 1/3 height, one 5%-in., one 3½-in.	Super VGA	2/1	Four 16-bit, two 32-bit	5.1 x 15.7 x 15.7	\$6,995 (100M)
Unisys Corp. (800) 448-1424	PW 800/486- 25A	25	DOS 4.01	ISA	Built ats 1486	8K	Internal cache only	8M/32M	One 3½-in. 1.44M	140M/640M	SCSI	5/0	VGA	2/1	One 8-bit, three 8/16-bit four 8/16/32-	21 x 6.5 x 19 (tower)	\$13,499 (140M
V.I.P.C. (415) 881-1772	VIPC 486-25	25	DOS 3.3, 4.01, SCO Unix	AT standard, optional EISA	Weitek 4167, built into 1486	8K, 256I	K Proprietary	1M/16M	One 5%-in. 1.2M	80M/1.2G	ESDI, Western Digital	10/or 5	None	2/2	Eight 16-bit	24 x 23 x 9	\$3,999
Wave Mate, Inc. (213) 533-8190	Bullet #666	25	DOS, Unix	EISA, ISA	Missink 4167, built into I486	8K, 64K, expand- able to 256K	Intel chip set	4M/64M	One 5¼in. 1.2M, one 3½ in. 1.44M	Any size	Any available	0/8	None	2/1	One 8-bit, seven 16/32- bit	6 x 16 x 14, tower model absorvedable	\$4,990

IN DEPTH

The delicate art of being credible

Honesty and a service focus win points with bosses, workers and users

BY WILLIAM HARRIS and SUSAN BEHNKE

ith the high turnover in information systems management these days, IS executives should be striving to protect their reputations.

It's time to learn the delicate art of staving credible.

Savvy IS managers already know this survival skill or are learning it. Unfortunately, many companies that have reorganized have diminished IS authority or will do so soon. Reduced authority, of course, is the last thing that a chief information officer wants: It's tantamount to being fired. It's also proof that the IS manager has ignored the signs of waning credibility (see story page 100).

To some degree, knowing how to build and protect a reputation is intuitive. Some IS managers just seem to always know what to do and when to do it. But it's also true that IS managers can learn how to be credible. The secret is to ask (and honestly answer) some

key questions.

Make no mistake: The process of building credibility is difficult. Being objective is hard, which is one reason for characterizing the art of staying credible as delicate. But credibility can make the difference between a brilliant IS career and mediocrity - or worse.

Before proceeding, you'll need to know a few things. First, you'll need a decent understanding of your corporation and its politics. You'll also need a good understanding of IS services - past and present - and relationships with outside vendors. And finally, you'll need to know about the personalities and politics involved in delivering and maintaining IS services.

In this process, it's especially important to view your users as customers. One good way to do this is by pretending that you are

Harris and Behnke are principals at Behnke Harris & Associates, Inc., a New York/Atlanta consultancy spe cializing in credibility building and integrating information technology with business strategies.

an outside consultant evaluating your organization. The discovery procedures and analyses used by consultants can be a great help in providing perspective on your situation.

Step 1: In-depth evaluation

After looking over the warning signs and applying them to your own situation, it's time

for a second, more in-depth evaluation that focuses on a few kev tasks:

• Defining overall operational philosophy of the IS organization. Is it dictatorial? User participative? Leadershiporiented and innovative? Reactive? Does IS carry out changes for executive management?

• Determining organizational differences between IS and users. Are they centralized? Decentralized? One centralized and the other decentralized? Do these similarities or differences cause conflicts?

· Quantifying the allocation of IS resources among various user groups. Who gets more? Less? What is the quality of resources assigned to different groups?

• Determining expectations. How are users' expectations of IS performance established? How are these expectations communicated to the corporation?

· Seeing how IS interacts with users. What are the people-to-people contacts? What are the contexts for their interaction? What "sales" documents are used by IS? What reports are issued? What are the interpersonal capabilities of IS representatives in-

volved in user contacts?

• Understanding user dissatisfaction. How is unhappiness manifested? What impact does this dissatisfaction have on IS activities and productivity?

• Comparing IS with other service organizations. Do users believe that other staff or outside vendor firms are better at de-



livering their services than IS? If so, why? What do these groups do that IS does not?

· Obtaining IS opinions. Which IS staff member should be asked for perceptions on problems in the department?

Step 2: Data evaluation

The next step in correcting problems and building credibility is to closely examine the data on users' dissatisfaction and organize findings that can be converted into action. Some possible categories:

• Developmental projects. Such projects may exceed cost and time budgets, produce

- · Credibility can be learned
- Asking the right questions is key
 - Opportunities abound

systems that do not match requirements or impose more change than users can handle. Problems may develop when users keep changing their specifications and IS cannot hit the moving target. Difficulties may also arise from inadequate user training on new systems.

 Computer processing and network services. Common problems are too much downtime, late fixes when things go wrong, numerous recurring problems, unresponsive IS people (including the help desk), hard-to-use or inadequate end-user tools, late reports or negotiated performance contracts not fulfilled by IS.

 Work effort prioritization process. Mechanisms for prioritizing and defining development and maintenance efforts may be inadequate or lacking. Prioritization efforts may not be communicated well through user ranks, or mechanisms for prioritizing maintenance requests may be missing. Often lacking is a mechanism for appeasement of users whose requests are rejected.

• Inadequate backup. Computers or networks may have become inoperable because backups don't exist. The loss of skilled personnel may delay or impair development or maintenance activities, and IS management may have proven itself inadequate in handling a vendor during emergency recovery and cooperative efforts.

• Conflicting corporate policies. This is a tricky area. IS may be the sole provider of its services. In contrast, users can go outside for services offered by other company departments. IS may have full chargeback, while other departments do not. Or the chief executive officer may be using IS as a point man in attempts to change corporate organization or culture.

• IS organizational and people sensitivity. IS personnel may be seen as dictatorial and wanting too much control. They may be seen lacking a sales orientation and understanding of the business they are serving. They also may be seen as unenthusiastic about educating users.

• User/customer understanding of IS. Besides inadequate performance, IS

How do you stay credible?

Mark W. Sullivan

Department Manager, Assistant Vice-President First Interstate Bank of Washington

You build credibility by staying current, reading various periodicals, participating in various seminars and keeping in touch with others in the industry. You need to live up to commitments and deliver products if you say you are going to. With employees, it's important to be honest and admit when you don't know something.

Senior Vice-President of Information Services Great American Life Insurance Co.

Los Angeles

First and foremost, you must not overcommit - do what you say you are going to do, and do it on time. You also need to demonstrate an understanding of business needs — speak a common language. It's also important to demonstrate your own expertise, to come up with the right answers before the questions are even asked.

You've got to show employees a willingness to work with them on their problems, to roll up your sleeves. You need to recognize and expect that there will be mistakes and not punish [people] when they occur. You always acknowledge when

a job gets done and is done well.

Timothy A. Kenney Manager of Information Services Systemetrics/McGraw Hill Santa Barbara, Calif.

The best way to stay credible is by maintaining a high level of service and communication and letting people know that you appreciate their business. You've got to understand that there is a never-ending goal to meet other people's needs and know their needs.

With employees, constant communication is key. So is committing to things and sticking to these commitments. You also need to hire qualified staff members and help out employees with their needs; for example, providing training and bet-

Michael Simmons

Executive Vice-President of Technical Operations Bank of Boston

Boston, Mass.

You need to be able to deliver products and services as indicated and the way people would like them. I never use force when not necessary. Have a clear understanding of problems, be open and honest and admit when a problem arises. You've also got to have confidence in your team's ability. You must be aware of everyone on your team and their abilities.

Michael Farrell Vice-President of Systems **Automatic Business Centers** Moorestown, N.J.

Deliver on time and tell them you will deliver on time — the message is more important then the fact. You need to meet your goals. Do your job and do it well - and let people know that you did it well.

STEFANIE MCCANN

faults may involve several other factors. Among them are a lack of appreciation of IS costs or benefits, insufficient commitment to the benefits by the users, a failure to comprehend the overhead or full lifecycle costs of IS and former IS staffers who as users second-guess the IS department. Another frequent failing is the lack of a post-implementation measurement of the value of a new IS setup.

• The IS organization itself. It may not be positioned properly within the company, may be improperly organized to serve its users or may not have the right people in the right positions

• IS infrastructure. Shortfalls here may involve such matters as appropriate controls, workable standards, policies and methodologies and adequate tools to ensure that IS can operate effectively.

Step 3: Action

Once the detailed evaluation is complete, it's time to develop credibility improvement recommendations and plans for implementing them. If these ideas seem unfamiliar, it could be a sign that new directions are in order.

Here's a good starting list of areas that provide opportunities for credibility im-

· Organizational. Including prioritization problems, development and maintenance shortfalls, funding or resource allocation problems among users and other

Tactic: Redefine IS functional re-sponsibilities and authority to ensure that necessary activities are not overlooked and are performed by the appropriate personnel (for example, establishment of IS sales, marketing and product development functions).

Tactic: Educate IS management and staff so they understand the business, company culture and politics as well as sales and marketing vis-a-vis selling IS to

other departments.

Tactic: Exploit training opportunities in several areas. Educate IS about trends in the use of information technology and train IS and general management on the necessity of integrating IS and business planning. Executive management should be trained in the understanding and in-volvement in IS. Users also should be trained to understand IS, especially the systems development and implementation processes.

Managerial.

Tactic: Establish a comprehensive management information and control program for the use of IS management.

Tactic: Adopt the philosophy that IS

should be run like a business. Establish a formal marketing and sales function, with personnel skilled in sales acting as user representatives. Work with customer service and sales performance criteria for employee evaluation and rewards.

Operational.

Tactic: Install and use appropriate standards, methodologies, control, quantitative analysis activities, etc., to help im-

NCE THE detailed evaluation is complete, it's time to develop credibility improvement recommendations and plans for implementing them.

prove development, maintenance and operational performance.

Tactic: Install new hardware or software to improve IS operational capability. Tactic: Acquire staff with the right

Tactic: Provide additional training of existing IS personnel.

Tactic: Use "customer appease-

ment" methods where appropriate; that is, a fast-response maintenance/enhancement team that allows users to go outside or get their own equipment until IS can support them.

Tactic: Adopt a marketing or public relations program involving the use of "annual reports," "quarterly reports" and special reports with respect to performance issues. The purpose of these is to recognize and reinforce positive perfor-

All these suggestions flow from a basic but all-important reality: IS is a service business and should operate like one. Cultivating a service mentality is the single most important ingredient in staying credible.

Warning signs for IS

for some of the following warning signs:

· You have met business objectives (or feel that you've met them), but you have not received appropriate recognition

· Others (users, chief executive officers, executive management, external customers of the firm, etc.) perceive that the information technology function is providing substandard service.

· Executive management is unhappy about the support the IS department is providing in terms of strategic use of information technology to bolster business and increase user and external customer productivity.

 You are receiving unsatisfactory support from an immediate superior, the executive steering committee or other key executives. • The technology plan and corporate

business plan are not well integrated.

s your credibility waning? Look • You are unable to sell executive management on appropriate budget levels, staffing and projects.

· You or your boss are dissatisfied with the marketing, customer service and business orientation of information technology staff.

· Hardware and software changes disrupt user activities. • The turnover in the IS department is

unacceptably high — and accelerating. • Recent projects involving outside consultants resulted in impractical solutions, costly overruns, demoralized IS staff members and severe political problems for the chief information offi-

 Data center performance in terms of uptime, response time, change management, currency of hardware and software or other management criteria is inadequate.

WILLIAM HARRIS AND SUSAN BEHNKE



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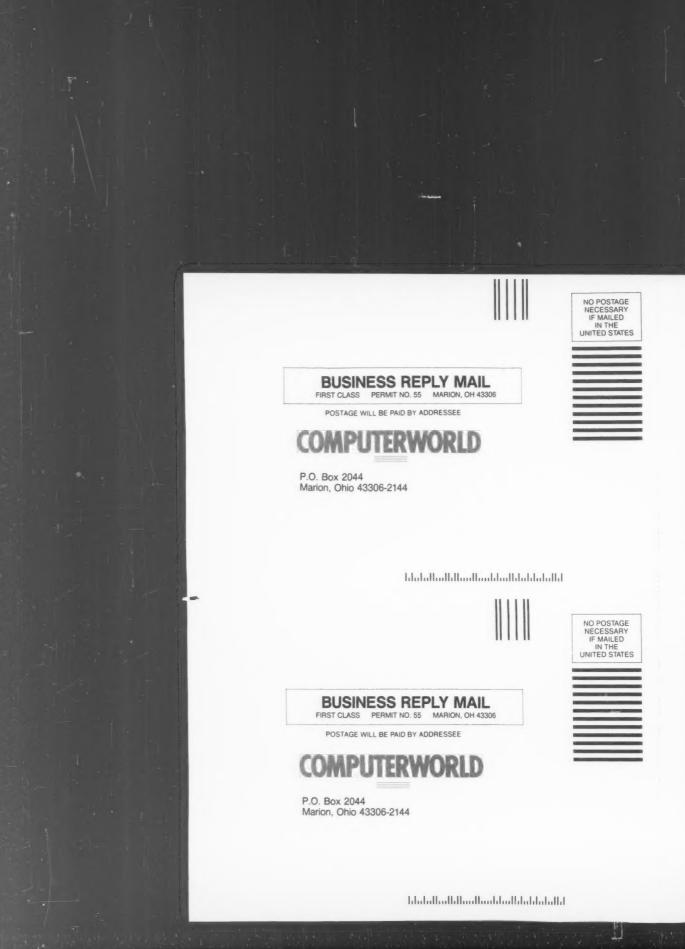
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COMPUTER INDUSTRY

NATIONAL BRIEFS

In time for Flag Day

Cypress Semiconductor Corp. has planted the Stars and Stripes in the Soviet semiconductor market. Cypress Chief Executive Officer T. J. Rodgers is off to Zelenograd — the so-called Silicon Valley of the USSR next month to discuss details of the technologies expected to emerge from the recently inked licensing pact under which his San Jose, Calif .based firm will acquire certain manufacturing technologies and semiconductor manufacturing licenses from the Soviet Union's International **Center for Informatics** and Electronics.

Money in the door

Embattled supercomputer firm FPS Computing (formerly Floating Point Systems, Inc.) signed a preliminary agreement last week, which was expected to result in a \$14.5 million investment by an institutional investor. President Howard Thrailkill credited the scientific/technical user community's warm reception of FPS' Model 500EA Unix-based line with attracting the asyet-unnamed investor. The money, he said, will be used to reduce debt and expand production and marketing.

More briefs on page 110

Chalk one up for Tally Systems

Software firm fills overlooked niche with PC Census, an inventory management tool

BY CLINTON WILDER

ally Systems Corp. has all the entrepreneurial earmarks of a software start-up from the go-go days of the early 1980s.

A huge list of "Things to Do" scrawled with a Magic Marker flows across three panels in a conference room, where bearded software engineers in chamois shirts exchange strategies with business-suited marketing types. Still, it's never so intense that the president can't spare a few moments for a scoop of Rainforest Crunch ice cream at the Ben & Jerry's store down the street.

From its peaceful A-frame headquarters in bucolic Hanover, N.H., Tally Systems hopes to grow by helping corporate information systems departments do their dirty work. Its software product, PC Census, automates the task of maintaining inventory of DOSbased personal computers throughout an organization - their model numbers, microprocessors, add-in boards and software. For PC and information center managers, that task is thankless, time-consuming - and often neglected altogether.

"Our competition," Tally Systems President Ted Jastrzembski said, "is a screwdriver and lots of interns in the summer

The early 1990s are hardly the best of times for embryonic high-tech firms, but Tally Systems officials said they believe that PC Census has found an overlooked niche. "MIS has been doing data center management for years," director of marketing Tom Cecere said. "As PCs become legitimate contenders for processing, managing

Up and Coming: Tally Systems Corb.



"Our competition is a screwdriver and lots of interns in the summer."

Location: Hanover, N.H.

Incorporated: 1990 as Tally Systems; 1972 as DTSS

......

- President: Ted Jastrzembski
- Employees: 15
- Product line: PC-based software for automated inventory of PC hardware and software in organizations

those should be given the same atten-

PC Census sells at a price point that PC managers can sign for without higher-up budget clearance, according to Jastrzembski. The combined hardware and software tracking modules sell for \$7.50 to \$12 per PC, depending on the size of the customer site, with a minimum of 50 PCs.

Tally Systems is brand-new in its present incarnation, but its roots go back 26 years to a joint research project between then-computer vendor General Electric Co. and the computer department at nearby Dartmouth College. That project developed the Dartmouth Time-Sharing System (DTSS) operating system for GE's computer line (later sold to Honeywell, Inc.). DTSS, Inc. was incorporated in 1972.

Metropolitan Life Insurance Co. acquired DTSS as a wholly owned subsidiary in 1978. DTSS developed close ties to Met Life's IS department, with Senior Vice-President of IS Daniel Cavanagh on its board and the IS shop serving as a test bed for DTSS prod-

Jastrzembski, after a career at software firms Comshare, Inc., Thorn EMI Computer Services, Inc. and market research firm International Data Corp., joined DTSS in 1987. In the late 1980s, when DTSS sought to diversify the business, PC Census was born albeit quite by accident.

DTSS was researching the market for an ambitious product that would distribute PC software from central

"We thought of the PC tracking module as just a small component of the whole system," Cecere said. "But Ted and I would get in the elevator after a customer visit, look at each other and say, 'Did you see them jumping out of their seats when we talked about

DTSS decided to shelve its other plans and concentrate on PC Census, which debuted in the market in 1989. Earlier this year, DTSS management purchased PC Census and other assets of the company from Met Life and set up operations as Tally Systems.

The newly independent Tally is small, with 60 customers in the U.S. and Canada and projected revenue of \$1 million to \$2 million this year. Jastrzembski said he believes the firm can

Continued on page 103

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The Newsweekly of Information
Systems Management

Tally

FROM PAGE 101

double in size next year — an ambitious plan, but one he said is reachable because of the need that the product meets.

"The challenge is making people aware that this is out there and then being there when they realize they need a PC inventory," he said.

Tally Systems hopes to find a lot more customers like Glenn Katz, who heads PC support at Leviton Manufacturing Co., a privately held maker of electronic lighting devices in Little Neck, N.Y. Before installing PC Census five months ago to track 300 PCs in 14 locations, "we had no idea what was out there," Katz said. "When we inputted the inventory data, it was never consistent. It took me three months just to clean up the database."

Katz said the product also helps him support users. "The next time they call and say they can't get Lotus 3.0 to run, I tell them to check their inventory tag," he said. "Sure enough, their machine doesn't have enough memory."

EXECUTIVE CORNER

AMD names new officer

Richard Previte is the new president and chief operating officer of Sunnyvale, Calif.-based Advanced Micro Devices, Inc. The 55-year-old Previte, a longtime Advanced Micro veteran, has also been elected to the firm's board of directors. Together with Chief Technical Officer Anthony Holbrook and company Chairman and Chief Executive Officer W.J. Sanders III, Previte holds the recently created Advanced Micro office of the chief executive.

Cambridge, Mass.-based international management consulting firm Index Group, Inc., a business unit of Computer Sciences Corp., recently named Senior Vice-President Adam D. Crescenzi its new managing director of European operations. Crescenzi, who will be responsible for the full sweep of projects handled through the burgeoning 5-year-old London-based headsucceeds Ronald quarters. Mackintosh, who is now chief executive of UK operations at **CSC Consulting.**

Waynesboro, Va.-based computer printer maker Genicom Corp. has a new president and CEO, 22-year IBM veteran Paul T. Winn. Winn, 43, most recently served as vice-president of graphics systems in IBM's Advanced Work Station Division.

In addition to PC managers in business and government, Tally Systems is courting businessoriented resellers such as Egghead Discount Software.

There, too, the biggest challenge is marketing. "We could rely on the [third-party] channel, but we have to create the opportunities ourselves to get the thing rolling," Jastrzembski said. PC Census "is something differ

ent. It's not another word processor or spreadsheet," he added.

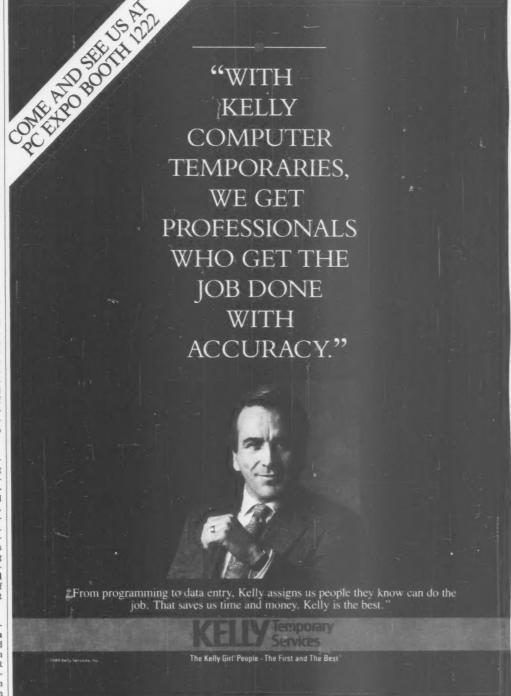
A PC Census diskette inserted into a PC automatically reads the configuration of that unit, printing out an inventory of disk drives, I/O ports, graphics adapter boards — whatever is installed. Tally Systems' recently introduced software inventory module does the same for soft-

ware, from the operating system to applications to Microsoft Corp. Windows 286.

"What I like about this product is it's very nonsexy," said E. Anne Gunn, director of field services. "It does a grungy, grunt work-type job, even though the technology behind it is mindboggling."

Tally Systems is betting its New Hampshire farm on the premise that PC managers, tired of glitzy new solutions in search of a problem, will snap up grungy, grunt work software that meets a need.

"I haven't seen any software like this before," Katz said. "If it wasn't for this, I'd just resign myself to not knowing what's out there. If they market it right and exploit that, I think they can be really successful."



INDUSTRY INSIGHT Richard Pastore

Tearing down export walls



How would you feel if you labored for years to dismantle an immense, offensive wall, only to find another wall looming on the other side? You'd feel kind of de-

feated, wouldn't you?
Well, that's how a lot of Eastern European computer users are feeling. Their countries have succeeded in tearing down the walls of Communist restriction and repression, but now they face a red, white and blue barricade of stubborn export restrictions separating them from U.S. high technology.

According to analysts, the U.S. lags behind its allies in modernizing export

The recent easing of restrictions on computer and telecommunications sales to the East by the Coordinating Committee on Multilateral Export Controls (Cocom) is a giant step in the right direction—a direction in which we should continue to advance.

Otherwise, Eastern Europe may look to other technology beacons — namely, Japan — and the U.S. will forfeit a valuable market opportunity.

In April, large numbers of Eastern Europeans were allowed to leave their countries for the first time to look at Western products displayed at Comdex/Europe in Paris. Their desires and needs came through clearly.

"They are hungry for hardware now, and in a few years they will be hungry for software," said computer center project manager Nada Kosir of her fellow Yugoslavians

Though the Eastern Europeans spoke proudly of their countries' recent achievements, disappointment was evident when conversation turned to the ITS

"Our import rules have been relaxed over the last several months; there are no restrictions anymore," said Damir Papandopulc, telecommunications manager at Elektra, Yugoslavia's largest electrical utility company.

The problem, he said, is that U.S. export regulations have not followed suit.

"We're more open, but we still have difficulty in legally importing U.S. equipment," said Prokop Toman, a Czechoslovakian economics professor. "Legally" is the key word. It is possi-

"Legally" is the key word. It is possible to obtain U.S. big iron by snaking it through a tangle of Far East and Western European distributors, but this channel is discouragingly difficult and expensive. Cocom has vowed to make such "gray marketing" even more difficult

"gray marketing" even more difficult.

The Romanians at the show talked of their hopes for U.S. trade with childlike eagerness. "Now we are open for business, for opportunities. This is a very unsaturated market," said Gheorghe Stefan Samoila, a senior engineer at the Institute for Computers (ITC), Romania's state-owned research center.

So far, however, their overtures have failed to breach the U.S. export barricade. "It is a problem to obtain imports from the U.S. We hope this will be relaxed in the future," said Calin Sandovici, a research and development engineer at ITC. Maybe this month's Cocom agreement is the answer to Sandovici's hopes.

Meanwhile, Romania is buying from U.S. competitors in Western Europe, Taiwan and Japan. It is also forming close alliances with France's Groupe Bull and Alcatel.

Some Eastern Europeans are even willing to leave their continent to plead their cases on our own shores. There will be interested parties from Yugoslavia, East Germany and the Soviet Union sizing up the vendor booths at the PC

Expo show this week in New York City, hoping to establish contacts with U.S. firms eager to export hardware and software.

Encouragingly, the U.S. Department of Commerce helped make these visits possible by allowing PC Expo promoters to publicize the show at U.S. embassies and consulates abroad.

With its Foreign Buyer Program, the Commerce Department is attempting to encourage contact between small and medium-size U.S. manufacturers and potential overseas customers.

Though the program is four years old, this is the first time the department has granted PC Expo the right to participate. The move is overdue.

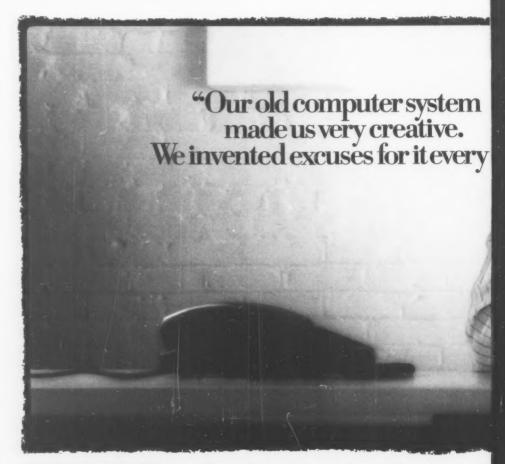
Granted, until very recently, most

Eastern European currencies have not had the hard backing necessary to purchase U.S. products directly.

However, in both Czechoslovakia and Hungary, the situation has improved dramatically, according to Toman and Papandopulo. Changes are also expected shortly in East Germany and other Eastern Bloc countries.

Now is the time for the U.S. computer industry to push the feds to exploit these market opportunities and establish good relations with budding capitalist economies. It's high time to knock down our own outdated wall of restriction — and not just by removing one row of bricks.

Pastore is a Computerworld staff writer.



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ness, note that it's one of the AS/400's great strengths. You can grow an AS/400 from a few to hundreds of users, and the process is relatively painless.

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D.C. area tops in system service

BY GARY H. ANTHES

Propelled by a 61% increase in three years, the Washington, D.C./Baltimore area has moved to first place in the number of people employed by computer service firms, edging out such high-tech enclaves as Silicon Valley, Massachusetts' Rt. 128 and the New York City region.

A study by the Washington/Baltimore Regional Association (WBRA) of 10 multicity metropolitan areas said that the area employs 69,867 people in firms providing computer programming, analysis, operations, maintenance and related services. The New York region employs 69,606, while Los Angeles/Anaheim/Riverside comes in third at 45,266 and San Francisco/Oakland/ San Jose places fourth at 43,636.

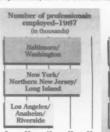
Nevertheless, Washington/Baltimore, with \$5.7 billion in sales, takes second place to New York in receipts for computer services. New York posted receipts of \$6.5 billion, while Silicon Valley grossed \$4.4 billion and the Los Angeles region took in \$3.7 billion.

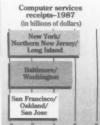
WBRA, using figures from the U.S. Census Bureau and the U.S. Department of Commerce, found mixed results when comparing salaries across the 10 metropolitan regions studied.

Systems analysts earned the most — \$844.50 per week — in the Houston/Galveston/Brazoria area and the least — \$723.50 — in Dallas/Ft. Worth. Programmers earned a top wage of \$708.50 in Silicon Valley and a low of \$580.50 in both Dallas/Ft. Worth and the Chicago area.

Operators' wages ranged from \$485.50 in Los Angeles/Anaheim/ Riverside to \$392 in Philadelphia/Wilmington/TrenCapital state

Baltimore/Washington may employ the most service professionals, but New York still rakes in the most cash





Sources: U.S. Department of Commerce, Washington / Reltimore Regional Association



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RRIEFS

Printer power

A decision late last month by West German technology companies Siemens AG and Mannesmann AG to combine their strengths in the worldwide printer market will mean a 50% expansion for Kent, Wash.based printer manufacturer

Mannesmann Tally Corp. The Mannesmann subsidiary — which is soon to be 49% owned by Siemens — will be starting its newly combined and broadened life with approximately \$450 million in worldwide revenue, as well as 2,400 employees and five major printer technologies.

Hitting a slump

Meanwhile, Paderborn, West Germany-based Nixdorf Computer AG, which is scheduled to merge with Siemens in early October to form what will reportedly be the largest computer company in Europe, reported 1989 annual revenue down 7% in the domestic market and up 4% worldwide compared with last year's figure. The year-to-year decline in revenue was a first for the entrepreneurial company - occasioned, a spokesman stated, by factors including a price slump in traditional Nixdorf markets and customer uncertainty in the face of the coming Siemens acqui-

Most wanted

The New Zealand Department of Justice has a desire to to be more vigilant when it comes to software copyright protection. First, however, the lawmakers would like to collar something that has proven to be elusive the world over: a definition of just what it is that is being protected. The hardest aspect of protecting software from copyright infringement, a department representative recently told the New Zealand Society for Computers and the Law, is developing an "inclusive and technically adequate" definition of a computer program.

REPORTER'S NOTEBOOK

Adapso buttons down, tones up

BY NELL MARGOLIS

WASHINGTON, D.C. — Adapso's recent semiannual management conference and computing services industry international congress found the software industry association recovered from the identity crisis that seemed to grip it a year or so ago — or at least better able to put on a calm front.

"This is the most businesslike Adapso I've ever seen," one longtime attendee

In the halls of the hotel, some 1,200

software mavens — approximately 33% from beyond U.S. borders, with the lion's share from Japan — gathered to hatch deals and negotiate alliances.

Missing was what one seasoned industry observer unfondly recalled as "the ego-driven self-aggrandizement and endless clubbiness" of conferences past.

Absent as well was the strain that marked more recent Adapso meetings: a concern with the wholesale defection of some of the industry's personal computer software firms from the decades-old association to the aggressively proactive and relatively young Software Publisher's As-

sociation (SPA).

"Frankly, if the issues that SPA is concentrating on — piracy, for instance—are a company's preoccupying issues, then SPA is probably where they should be," former IBMer and current Adapso spokesman William Warner said. "Adapso is trying to represent the software industry as a whole and on a whole-world basis."

It would be naive to believe that Adapso's recent turmoil could be so neatly dispatched. One longtime member, for example, dropped out this year when faced with the prospect of a dues raise — itself an indirect result of the SPA challenge. Another member, a high-profile young software company, is hanging in with Adapso for the moment, but one of its co-

founders acknowledged that it was casting sidelong glances at SPA. The industry, he observed, changes quickly, and Adapso always seems a day late and a dollar short.

Nevertheless, according to Warner, the six months since the last Adapso confab have seen positive gains, even in the association's touchy area: Such notable firms as U.S. Sprint Communications Co., The Gartner Group and long-sought-after but elusive Computer Associates International, Inc. joined; McDonnell Douglas Computer Systems Co., a former Adapso member, rejoined.

The newly buttoned-down and tonedup Adapso meeting featured the follow-

• A deal-making session in which each participant took the podium, introduced his company and described what kind of strategic partners it was in the market for. The "slave-market" forum, an experiment only three meetings ago, is now a staple of Adapso conferences.

• A keynote speech by Japan Economic Foundation President Shoichi Akazawa. This was a homecoming of sorts, because Akazawa, who is also the former chairman of the Japan External Trade Organization, was the keynote speaker at Adapso's premier world congress held in San Francisco 10 years ago. Akazawa urged his audience to shun protectionism and to continue to embrace trade negotiation. He also mentioned in passing that "80% of the parts in American computers are made in Japan."

 A workshop in which systems integrators sought to discover what users really want from them — fewer buzzwords, clear agendas and a quick trip from promise to performance.

An address by Merrill Lynch & Co. Executive Vice-President DuWayne Peterson Jr. on what large customers expect from the software industry: standards and easy-to-use products — and also fewer buzzwords, clear agendas and a quick trip from promise to performance.

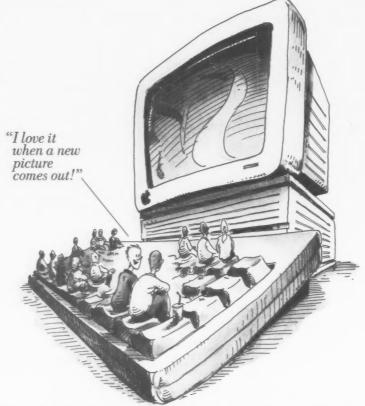
Bell Atlantic consolidates

FRAZER, Pa. — Bell Atlantic Customer Services, Inc. recently merged the muscle of its three computer hardware maintenance arms into a single service. The new entity, dubbed Bell Atlantic Computer Technology Services, Inc., moves into place as the largest U.S. fourth-party support services company, Bell Atlantic claimed.

Bell Atlantic said it consolidated the three units to eliminate redundancies and provide customers with a single point of contact. The units supply parts and repairs for large businesses that handle their own maintenance, OEMs and third-party maintainers such as the former Sorbus, Inc., now a separate Bell Atlantic subsidiary.

The three merged divisions are former Camex-CPX, which specializes in Control Data Corp. parts and repairs; Dynservice Network, which repairs IBM and Digital Equipment Corp. head disk assemblies and peripherals; and Electronic Service Specialists Ltd., a DEC repair specialist.

John Welsh, executive director of sales and marketing, said the group will add new platforms to its service roster later this year.



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Federal IS vendors: There's good and bad news

BY GARY H. ANTHES

WASHINGTON, D.C. - If you are selling products or services that support electronic data interchange, electronic imaging, computer operations and maintenance or anything to support a high-tech war on drugs, now may be the time to open that office in Washington. But if you are into leased telecommunications services or mainframes, you can expect slim pickings from the federal government during the next five years.

Those are among the conclusions to be drawn from an extensive analysis and forecast of the federal information systems market recently released by the Electronic Industries Association (EIA).

The EIA said that Uncle Sam's spending on IS will show declining real growth during the next years, moving slowly from \$19.4 billion in 1991 to a nearly flat \$20.3 billion in 1995. IS outlays by the U.S. Department of Defense (DOD) will actually decline, but spending will be strong at the National Aeronautics and Space Administration, the Environmental Protection Agency (EPA) and the Departments of Agriculture, Transportation and the Treasury, according to the EIA.

For defense, which will show an aver-

Low funding

Real growth of government information systems spending will continue to fall over the next five years, according to projections

Fiscal year	1991	1992	1993	1994	1995
Real growth	3.8%	2.2%	1.3%	0.9%	0.5%
Expenditure (in billions)	\$19.4	\$19.8	\$20.0	\$20.2	\$20.3

age 1.2% annual fall in IS expenditures, spending will be aimed at those systems promising to reduce manpower costs. A new DOD program, called Corporate Information Management, will drive much of what the Pentagon spends for its nonembedded and non-mission-critical systems, the EIA said.

In civilian agencies, IS spending increases will be driven by a growing trend to contract out to save on personnel costs, and agencies that traditionally do a lot of such as outsourcing NASA and the EPA — will lead the way, the EIA said. Agencies that traditionally do a lot of outsourcing will post 5.6% annual increases

in IS spending, while civilian agencies will show only 3.1% gains.

Aggregate software purchases will be flat - no growth over the period - but sales of commercial off-the-shelf software and software tools will do better than average, the EIA said.

In commercial services, operations and maintenance will post a strong 3.7% annual gain, driven by budget squeezes that require retention and support of existing systems, and computer time-sharing outlays will rise 2.4% per year. Leased telecommunications services are expected to fall 1.3% annually.

Corporate Information Management is an attempt to reduce the number of redundant systems in the DOD and to define common data requirements and formats for applications such as payroll, distribution and contract payments. The EIA estimated Corporate Information Management will save the government \$2.2 billion over the next five years. There will be fewer small systems but more opportunities for systems integrators to build large ones, the association said.

Industry Professionals Rate Document Imaging Companies 1990 AIIM/Datapro Survey Wang Kodak IBM FileNet 9 2 6 2 **Overall Satisfaction** 6 12 7 Software Features/Functions A 9 5 Storage Media (Systems) 8 A 2 Expansion Capabilities w/o Conv. 3 7 4 2 11 Documentation 6 1 3 Image Quality/Resolution 11 2 8 10 Capture/Retrieval 2 Customization Capabilities 3 8 2 Input/Output Devices Supported 6 3 System Security/Recovery Features 3 Ease of Use Service/S

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petitive environment, you can't afford to overlook the benefits imaging can bring to your business.

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NATIONAL

Slimming with Shark

Wang Laboratories, Inc. earlier this month closed the sale of its Wang Financial Information Services Corp. to a newly formed Infotechnology, Inc. subsidiary called Shark Information Services Corp. The approximately \$16 million purchase price will go toward debt reduction and working capital, said a Wang spokesman, who also noted that the company will continue to supply financial market data to its customers.

Finally CFO

Control Data Corp. now boasts a new executive vice-president and chief financial officer, filling a slot that has been vacant for nearly a year. William J. Miller, 44, recently acting president of Micrognosis, CDC's trading room systems unit, assumed the title on June 11, reporting to CDC President and Chief Executive Officer Lawrence Perlman. Perlman has been acting CFO since the departure of John K. Buckner last

COMPUTER CAREERS

IS execs: In search of survival

Fertile organizations offer support, involvement and bench strength

BY JAY GAINES SPECIAL TO CW

n recent months, there has been a tremendous amount of movement within the ranks of top information systems executives, particularly in financial services, in which technology plays an integral role.

In a few isolated cases, IS executives have been elevated to general management posts. Most of the time, however, executives appear to be playing a game of musical chairs in which an individual who has met expectations marginally or not at all in one job is tapped to solve a whole new set of problems.

Unfortunately, the track record of top systems executives entering an organization from the outside is poor. The odds are that such an individual will not be on hand three to four years down

Breaking in

Among senior management positions, the job of top IS executive may be the most difficult to enter from outside a company. The difficulty arises from barriers of psychology, culture and lan-guage, as well as the expectations surrounding the role.

Invariably, the new IS executive suffers from culture shock

as he learns how to operate as part of the management team while taking charge of the initiatives that he was hired to pursue.

The IS executive's isolation can be compounded by a personal style and manner of speaking that are overly technical in ori-

entation, a lack of comfort with technology on the part of management, the typically large level of investment in technology and the long time frame for completion of many projects.

The isolation also increases dramatically if the executive's agenda is viewed as one of technology initiatives rather than the needs and wants of the business unit or enterprise.

Blending in becomes even more difficult, and the chance of success lower, based on the extent to which the IS executive has a large and fragile ego, a bigbucks compensation package, a high profile and a high level of expectations.

In examining the factors that can hobble a new top IS executive, it is helpful to look at the handful of corporate cultures where technology has thrived and contributed meaningfully to the operations it supports.

The top IS executives in

these environments have been well-integrated into the management culture, and some of them have gone on to win significant general management responsibilities.

At numerous other organizations, there are pockets of suc-

cessful IS activity. Here again, the role of organizational integration is key.

The following are true in both these groups of successful entities:

• The organizations tend to be flat, rath-

er than hierarchical. There is strength throughout the ranks of information technology professionals. The role of the top IS executive is coordinating and supporting.

• Management encourages experimentation, innovation and managed risk-taking.

• The mind-set of the information technology professional is in sync with the business. It is focused on making technology work and generally on keeping it simple.

· Successes tend to result from successive hits more than delivery of a megaproject intended to fix everything.

The critical factor for a corporate environment where the information technology discipline

thrives is attracting the most promising individuals into the IS organization, helping them develop and ensuring their integration with the business.

The job of building this environment is an undertaking to be shared by top management, the IS organization and the business

However, many of these business roles quickly become deadend jobs; they don't compare to the opportunities in the IS arena available to a strong performer.

It is important to note, howthat IS professionals should demand that their organization provide the opportunity to be successful in IS.

UCCESSES TEND to result from successive hits more than delivery of a megaproject intended to fix everything.

The key professionals in the IS organization must grasp the needs and dynamics of the business. At the same time, they must educate business professionals about the role and benefits of technology.

This type of behavior must be ingrained in the culture and apparent to professionals early in their careers if the organization is to forge a competitive edge through technology - and if IS executives are to make major career advancements.

Hidden treasures

It is also important for these organizations to keep managers in the IS organization. Individuals rising within the ranks of IS management often do not recognize what a valuable commodity they are or might become. They sometimes get distracted along the way, viewing jobs in business units as better opportunities than the ones in front of them.

They should take the initiative to identify the skills and experiences they need to reach their professional goals: exposure to competitive and strategic issues, for example, or the proper mix of applications development and technical operations. They should then demand that their organization provide opportunities for them to develop these skills and gain the experience.

Given an IS organization with this kind of depth, the successful IS leader still must ensure that he is integrated into the day-today thinking and operations of the company and has support from and access to top management. Top management can facilitate the integration of IS activity by perceiving the IS executive as an integral part of the team.

Gaines is president of Jav Gaines & Co. a New York-based executive search firm.



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under design and resolution of engineering problems. Design and coor-nate loop control and display diagrams or process control and monitor-computers. PCC PROGRAMMER: Provide technical analysis, minor engi

A bachelor degree in computer science, engineering, or mathematics required. Six years experience with programming process computers (IBM), and two years programming on-line real time computers required.

PCC TECHNICIAN-DEC: Troubleshoot, test, repair, and main-

PCC TECHNICIAN-DEC: Troubleshoot, test, repair, and maintain process computer hardware and related equipment.

An accredited technical institute certificate with specialty in process computer hardware required. Five years experience of which two have been in a power plant, desalinization plant or chemical plant.

Technical training on (DEC) PDP31144, PDP311/23, PDP311/03 computer systems and associated peripherals. Training must have included vendor diagnostics and RSx11 operating system programs.

PCC TECHNICIAN-INDACTIC: Duties, education, and experience same as above. Technical training of Brown Boveri & Cie INDACTIC 33/41, a telecommunications station hardware maintenance course required. Experience on design, implementation, and maintenance of VF communications networks to include RS 232 protocols and 4 ma to 20 ma control and data acquisition loops is highly desirable. Two years experience in maintenance of associated plant instrumentation loops and equipment required.

PCC TECHNICIAN-NETWORK 90: Duties, education, and erience same as PCC Tech-DEC

Technical training of Baily Controls Network-90 multiplex and/or controls secunical training of basisy Control Networks Municipal and/or Controls system hardware maintenance required. Experience on design, implementation, and maintenance of VF communications networks to include RS 232 protocols and 4 ma to 20 ma control and data acquisition loops is highly desirable. Two years experience in maintenance of associated plant instrumentation loops and equipment required.

PCC HARDWARE ENGINEER: Responsible for technical and design support for all activities requiring use and maintenance of on-line process computer systems.

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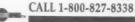
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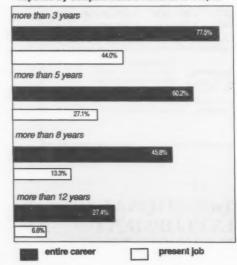
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Equipment arbitrage can let you upgrade technology without red ink

BY THOMAS D. OLESON SPECIAL TO CW

've got to say this quietly. If everyone knows about it, and everyone tries it at the same time, it won't work. I'm talking about . . . shhh . . . equipment arbitrage. What is it?

Arbitrage means buying in a weak market and selling in a strong market. In the case of computer equipment, this means buying at deep discounts early in a product's life, then selling before prices in the used equipment market drop with the introduction of replacement technology. The result is a leading-edge technology strategy that minimizes the financial bleeding.

Let's review the basic rules of buying at a deep discount. You don't all work for Humongous Enterprises, Inc., so you may not be able to buy 1,000 personal computers at a crack for a 40% discount. But you probably don't have to buy just one at a time with no discount. If a year's worth of buying is 200 machines, and you purchase them together, you may get a 33% discount. You may even be able to buy PCs to cover needs for three years, put them on an operating lease that comes to less than 90% of

the equipment's value and spread the payments over three years.

The idea is to maximize the discount by any means: a volume purchase agreement, a dollar volume discount or a package deal involving other equipment.

There are a number of critical prerequisites to the deal. One is a philosophy supporting the use of leading-edge platforms. Another is gaining or maintaining control over the distributed tech-

nology that users own and depreciate on their budgets. These PCs, terminals, printers, modems and control units are among the best types of equipment for arbitrage, but if users control them, you won't be able to convince them to sell the equipment in time to pull off the arbitrage.

Depreciation is the next consideration. To make a decent profit, vendors have to churn out new technology rapidly. Most of us were trained to depreciate equipment over five years, which allows the hardware giants to create book losses for us. They'll release new technology at a clip that pushes market values significantly below book values. Why

not reduce your depreciation period to four years for most equipment so you won't be hit with these book losses?

Whether purchased or leased, the timing of your move to the new technology is critical. Once new technology begins to re-

> place current equipment, used devices on the secondary market will drive down the value of your assets. You must move quickly. How quickly? It

How quickly? It depends on the vendor's production

schedule and marketing strategy, but three to four months may be too long to wait. To avoid delays, get acquisitions pre-approved, based on agreed-on assumptions. Research upcoming product announcements with staff members, technology think tanks and the vendor. Determine what the new product will do and when it is likely to arrive.

Here's a concrete example: A printer sold in late 1988 for \$4,400. Through a volume purchase, you might have gotten a 27% discount, yielding a cost of just over \$3,200. The used market price was still \$3,300 in November 1989 but fell to \$2,100 by May 1990. Had you pur-

chased the machines as late as the fall of 1988, you could have used them free for a year and replaced them with laser jet technology. But had you kept them for 18 months, they would have cost you \$1,100 each, ignoring depreciation.

Once you buy, what do you do with all of the old equipment? You might find a third-party remarketer who has a better opinion of it than you do, but therein lies the problem. Remarketers should have pretty much the same sense of its worth as you do.

Know thy lessor

The rule is, "Know thy lessor or broker." First, deal only with the ones you know personally, have worked with in the past and trust. Then assume you will give them a fair profit, even if it means settling for less than everything you'd like to get. And don't tell the world you have a lot of equipment to dump; if word gets around, it will drive your price down.

price down.

If you wish to collect top dollar from each sale yourself, offer the broker a flat remarketing fee for each machine sold, hold the unsold equipment and collect the proceeds from sales. Because you continue to own the equipment, you, not the broker, bear the full risk and thus deserve the lion's share of any profit. By doing this, you can minimize the remarketing fee. This approach poses no risk to the broker but

also offers little incentive to sell the machines, let alone to get the best price. You may end up with a bunch of unsold equipment after the market has softened.

A modification of this approach can bring you a higher total return and lessen the risk that
equipment will go unsold. Agree
up front to a partial payment
from the broker for all the equipment and a percentage split of
the rest of the proceeds that
gives the broker more profit
than usual. This kind of deal provides the broker with a greater
incentive to get rid of the equipment before the market drops. If
this goal is achieved, the result
should be a win-win situation.

That's equipment arbitrage: For the right type of equipment, it's the ultimate in leading-edge technology strategies.

Oleson is financial director of information processing at John Hancock Financial Services in Boston.

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XT Model 086	\$500	\$700	\$350
XT Model 089	\$650	\$825	\$475
AT Model 099	\$1,000	\$1,375	\$850
AT Model 239	\$1,100	\$1,325	\$700
AT Model 339	\$1,200	\$1,400	\$900
PS/2 Model 50	\$1,300	\$1,700	\$1,050
PS/2 Model 60	\$2,060	\$2,200	\$2,000
Compaq Portable II	\$1,475	\$1,725	\$1,400
Portable III	\$2,275	\$2,500	\$1,900
Portable 286	\$1,700	\$2,000	\$1,500
Plus	\$650	\$750	\$650
Deskpro	\$825	\$900	\$800
Deskpro 286	\$1,400	\$1,625	\$1,300
Deskpro 386/16	\$2,500	\$2,750	\$2,475
Apple Macintosh 512	\$500	\$775	\$450
512E	\$450	\$450	\$350
Plus	\$1,150	\$1,275	\$1,000
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TRAINING

Creating off-the-shelf training

Firms roll their own video and demo programs for inexpensive tutorials

BY JESSICA KEYES

lexander Pope once said that "a little learning is a dangerous thing." Though he didn't have computer training in mind, his comment is certainly applicable to it.

The basic problem with computer training is that its message is short-lived. Information systems professionals and personal computer users are equally likely to retain little of what they are taught in expensive seminars. In fact, studies have indicated that the human mind retains less than 10% of what it hears.

Education is too expensive for us to throw 90% of it down the drain. Don't get me wrong: I'm not advocating an end to seminars and classes. However, several less expensive forms of "off-the-shelf training" can serve as adjuncts to live training and as substitutes for it in certain situations

By off-the-shelf training, I mean the student can grab a video or a set of disks from a library and learn by himself, at his own pace. He can start and restart a session as many times as he wants without slowing down anyone else.

This approach can help drive home the 90% of training that people don't retain the first time around, and it can stand in when live training isn't possible or practical. Do you have programmers scattered around the country in places where training facil-

ities are not readily available? Just ship them a disk or videotape.

A lot of progress has been made on the videotape front since I was a programmer and watched countless

dry and boring tapes of men with white shirts, bow ties and crew cuts teaching assembler and similar tools. Videotape training has been spruced up; instructors speak better and camera movements are more sophisticated. Today, it also covers esoteric subjects that can make a techie salivate: expert systems, neural

networks, the C language and even the new C++ language.

What do you do if there is no videotape training for your topic of choice? One solution is to create your own. It's not as difficult as it sounds. With camcorders available for purchase or rent, your company might be wise to make use of them as an educational tool. One organization I know of that was training several hundred users in a new home-

grown mainframe decision-support system held live training sessions, but managers found they needed to reinforce the material, so they videotaped their sessions.

Most camcorders tape from PCs or CRTs quite nicely, as long as the camcorder is set up on a tripod and focused carefully. A prepared script helps, too.

What is true for videotape training is also true for diskbased tutorials. By now, nearly every computer user has tried one of countless such programs, which often come with packaged applications. They, too, are available for a wide range of subjects, including telecommunications, SQL, C and the Ada language.

Still, the list may not be exhaustive enough. You may need to develop a program for a homegrown system or a commercial product for which disk-based training is not available. As with videotapes, you can do it yourself; there are many tools available in the market to help you.

There are two types of software that you can use for this task. The first is called demonstration software. One of the nice things about it is its ability to capture screens. Let's say you just wrote a payroll processing system. If it is on a host processor, you use emulation software to view screens on a PC. Using the screen-capture utility, you capture the pertinent screens by hitting a combination of PC keys. Then you retrieve the screens and enter text that will guide the novice payroll employee through the system's commands.

When the user boots up the "Payroll Trainer," he can walk through the steps necessary to log on to the payroll system and enter data on a new employee, modify records or even generate checks. There are a handful of

popular demo programs on the market; they cost about \$300.

You can develop a more advanced form of PC-based training using an authoring system. Authoring systems are complex packages that provide elegant features such as scripted tutorials, pull-down menus, prompt windows, animation, music, sound and even synthesized speech.

With this type of software, you can build interactive instruction in everything from an introduction to computers for naive end users to Cobol for programmer trainees and expert system methodologies for advanced systems professionals. On average, the authoring programs cost approximately \$500. They are geared for use by trainers, who will usually need a day or two to get started with one.

Pope was right. A little learning is a dangerous thing. We must train completely and effectively. To educate IS staff members and computer users in that manner, the people in charge must employ a variety of methods. Off-the-shelf programs might have made Pope sit up and take notice.

Keyes is president of New Art, Inc., a management and computer consulting firm in New York.

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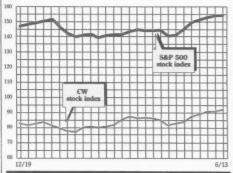
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00000	CONTEL CORP DATA SWITCH CORP	37	23	28.875	-1.8	-5.7	4	INC	5	4	4.25	0.2	4.6
×	DIGITAL COMM ASSOC	27	17	3.5 24.375	0.1	3.7	0	PRINTRONIX INC	15	7	14	-0.1	-0.9
X	DYNATECH CORP	21	15	16	0.3	1.0	Ň	OMS INC	21	8	20,625	2.8	15.4
X	FIBRONICS INTNL INC	11	5	10.375	1.3	13.7	0	QUANTUM CORP	23	9	21.25	1.0	4.9
ň	GANDALF TECHNOLOGIES	7	2	3.5	0.4	12.0	Ñ	RECOGNITION EQUIP INC	13	5	4.875	0.1	2.6
QN	GENERAL DATACOMM INDS	7	3	4.125	0.0	0.0	0	REXON INC	10	6	8.625	0.0	0.0
N	GTE CORP	72	52	64.75	-0.1	-0.2	ò	SEAGATE TECHNOLOGY	20	10	15.5	0.5	3.3
Ö	INFOTRON SYS CORP	13	4	3.75	-0.3	-6.3	N	STORAGE TECH CORP	34	9	34	1.9	5.8
Ň	ITT CORP	65	51	59,375	1.1	1.9	0	TANDON CORP	3	0	2.75	0.2	7.3
10	M A COM INC	9	3	5	-0.3	-4.8	Ñ	TEKTRONIX INC	24	12	14.875	1.0	7.2
0	MCI COMMUNICATIONS CORP	49	31	43.625	1.6	3.9	0	TELEVIDEO SYS INC	1	0	0.489	0.0	-6.2
Ñ	NETWORK EQUIPTECH INC	34	9	9.375	-0.6	-6.3	N	XEROX CORP	69	46	47.875	0.4	8.0
	NETWORK SYS CORP	15	7	14.75	-0.1	-0.8							
QN	NORTHERN TELECOM LTD	30	18	29.25	0.0	0.0		T annim	-0		anian		
0	NOVELLING	55	24	54.25	4.5	9.0		Leasin	gu	ошр	ames		
Ñ	NYNEX CORP	92	75	87.25	-1.5	-1.7			-				
N	PACIFIC TELESIS GROUP	52	39	45.5	-1.4	-2.9							
A	PENRIL CORP	7	4	7	0.0	0.0	N	CAPITAL ASSOC INTNL INC	- 8	3	3.25	0.1	4.0
N	SCIENTIFIC ATLANTA INC	29	17	27.25	0.0	0.0	N	COMDISCO INC	34	17	19	-0.1	-0.7
N	SOUTHWESTERN BELL CORP	65	50	57	-0.6	-1.1	Q	LDI CORPORATION	18	13	16	1.0	6.7
QN	3 COM CORP	21	10	15.375	1.9	13.9	Q	PHOENIX AMERN INC	5	3	3.875	0.0	0.0
Ñ	USWESTING	41	33	37.5	-0.4	-1.0							
							EX	CH: N-NEW YORK; A-AMERICA	N; Q=	PLATION	GAL.		

Com		C	A
Lom	nurer	SVS	rems

3	ALLIANT COMPUTER SYS	8	4	8.125	0.8	10.2	
į	ALPHA MICROSYSTEMS	8	3	3.375	-0.3	-6.9	
,	ALTOS COMPUTER SYS	8	5	5.375	0.1	2.4	
	AMDAHL CORP APPLE COMPUTER INC	22 50	32	15.5 39.75	0.1	0.8	
2	AST RESH INC	26	7	24.5	0.3	-0.5	
ď	BOLT BERANEK & NEWMAN	9	A	4.875	0.0	0.0	
ů	COMPAQ COMPUTER CORP	120	73	125.25	2.1	1.7	
i	COMMODORE INTIVI	18	6	8,125	-0.4	-4.4	
i	CONTROL DATA CORP	23	16	19.5	-0.6	-3.1	
ŭ	CRAY RESH INC	53	31	49.375	-1.1	-2.2	
Ó	DAISY SYS CORP	5	0	0.438	0.0	0.0	
5	COMMODORE INTINL CONTROL DATA CORP CRAY RESH INC DAISY SY'S CORP DATA GEN CORP DATA POINT CORP DELL CORP	19	8	12	0.1	1.1	
N	DATAPOINT CORP	6	2	3	0.0	0.0	
3	DELL COMPUTER CORP DIGITAL EQUIP CORP		5	11.125	0.3	2.3	
	DIGITAL EQUIP CORP	103	70	88.125	-2.1	-2.4	
N	FLOATING POINT SYS INC	4	0	2.25	0.5	28.6	
N		40	28	35	-0.9	-2.4	
Ñ.	HEWLETT PACKARD CO	58	40	48.25	-0.6	-1.3	
	HEWLETT PACKARD CO HONEYWELL INC IBM	103	73	99.75	-0.1 0.8	-0.1	
2002	INFORMATION INTLINC	122	93	121.375	-0.8	-5.7	
8	IPL SYS INC	16	5	10	0.1	1.3	
ă.	MAI BASIC FOUR INC	7	2	2.125	-0.4	-15.0	
ũ	MATSUSHITA ELEC INDLLTD		123	141.25	-2.9	-2.0	
	MENTOR GRAPHICS CORP	26	14	24.75	-1.0	-3.9	
Š	NBLINC	3	0	0.125	0.0	-19.9	
Ú	NCR CORP	72	53	69	0.8	1.1	
COOPER	PYRAMID TECHNOLOGY	36	10	32	-0.8	-2.3	
Ź.	SEQUENT COMP SYS INC	34	11	33.625	1.6	5.1	
Ş	SHAREBASE CORP	3	0	0.469	0.0	0.0	
g	SUN MICROSYSTEM INC	34	13	33.375	2.4	7.7	
5	SYMBOLICS INC	2	0	0.563	0.0	0.0	
N	TANDEM COMPUTERS INC	30	17	24.375	-0.5	-2.0	
N.	IANDY CORP	49	30	36.625	0.8	2.1	
N.	ULIMATE CORP	27	12	F4.275	-0.5	5.7	
Ň.	TANDY CORP ULTIMATE CORP UNISYS CORP WANG LABS INC	8	12	4.5	0.0	0.0	
-	THING LADO INC	0	4	4.0	0.0	0.0	

Software & DP Services

ř	AMERICAN MGMT SYS INC	17	11	16.375	2.0	13.9
ı	AMERICAN SOFTWARE INC ANACOMPING	26	14	25 3.125	0.8	3.1
	ANALYSTS INTL CORP	21	14	20.25	0.5	2.5
	ASHTON TATE	19	9	11.25	-0.5	-4.3
	ASK COMPUTER SYS INC	15	7	9	-0.5	-5.3
	AUTO DATA PROCESSING	59	39	56.75	-0.4	-0.7
5	ALITODESKING	53	33	52.5	3.0	6.1
5	BMC SOFTWARE INC	29	12	28.75	1.9	7.0
i	BUSINESSLAND INC	14	7	8.875	-0.3	-2.7
,	COGNOS INC	9	4	8.875	0.3	2.9
i	COMPUTER ASSOC INTL INC	20	11	16	-0.3	-1.5
1	COMPUTER HORIZONS CORP	16	7	13.5	-1.3	-8.5
ŧ	COMPUTER SCIENCES CORP	59	40	47.375	-1.4	-2.8
ı	COMPUTER TASK GROUP INC	14	9	11.5	0.0	0.0
}	COMSHARE INC	23	15	23.25	2.0	9.4
}	CORPORATE SOFTWARE	16	8	14.25	1.0	7.5
1	COMPORATE SOFTWARE GENERAL MTRS (CLS E) HOGAN SYS INC INFORMIX CORP INTELLICORP INC LEGENT CORP LOTUS DEV CORP MICROSOFT CORP	37	24	36	0.9	2.5
2	HOGAN SYS INC	7	4	3.75	-0.1	-3.2
9	INFORMIX CORP	17	8	16.25	-0.3	-1.5
3	INTELLICORP INC	7	3		-0.3	-3.6
?	LEGENT CORP	32	19	28.75	3.1	12.2
ŧ.	TOTOS DEA COMS	39 79	21	38.625	1.5	4.0
ŧ.	NATIONAL DATA CORP	35	26	76.5 15.5	3.5	4.8
ŀ	ON LINE SOFTWARE INTLINC	11	6	7.75	0.0	0.0
:	ORACLE SYS CORP	28	15	21	-0.1	-0.6
1	PANSOPHIC SYS INC	19	10	14.25	2.1	17.5
	PHOENIX TECHNOLOGIES INC	14	2	4.875	1.3	34.5
5	POLICY MGMT SYS CORP	42	28	41	0.3	0.6
5	PROGRAMMING & SYS INC	25	16	22.5	-1.0	-4.3
5	RELATIONAL TECH INC	11	5	6.75	-0.8	-10.0
ì	REYNOLDS & REYNOLDS CO	31	19	23.375	0.1	0.5
)	SAGE SOFTWARE INC	16	7	15,125	0.4	2.5
)	SEICORP	21	15	20.5	0.5	2.5
9	SHARED MED SYS CORP		12	12.875	-0.1	-1.0
9	SOFTWARE PUBG CORP	28	13	26.625	0.6	2.4
ı	STERLING SOFTWARE INC	11	7	10	-0.4	-3.6
,	SUNGARD DATA SYS INC	26	16	23.5	0.8	3.3
ē	SYSTEM CENTER INC	26	17	24	1.9	8.5
	SYSTEM CENTER INC SYS. SOFT INC WORDSTAR	29	14	25.75	-1.0	-3.7
l	WORDSTAR	3	1	0.938	-0.1	-6.2
2	WORDSTAR	3	i	0.938	-0.1	

Semiconductors

N	ADV MICRO DEVICES INC	1.1	7	9.875	-0.4	-3.7
Ú.	ANALOG DEVICES INC	1.1	7	8	-0.5	-5.9
)	ANALOGIC CORP	11	8	8.875	0.1	1.4
ć	CHIPS & TECHNOLOGIES INC	26	15	20.125	1.1	5.9
õ	INTEL CORP	49	28	48	0.3	0.5
ć	MICRON TECHNOLOGY INC	25	7	14.375	0.1	0.9
Ñ	MOTOROLA INC	87	51	86.625	3.4	4.1
N	NATL SEMICONDUCTOR	9	5	8	0.0	0.0
W	TEXAS INSTRS INC	44	28	39.875	-1.4	-3.3
A	WESTERN DIGITAL CORP	15	6	14.625	1.5	11.4

Overboard

Tech investors jettison shares as profit dips loom on horizon

Fickle isn't the word for it. It may be wise to shed stock in a firm whose earnings have fallen, but what is it when investors jump to dump shares on mere speculation of lowerthan-expected profits?

Nothing but trouble, according to Vitalink Communications Corp. After saying that earnings for the current quarter may dip, Vitalink watched its stock slip 2% points by Thursday to close at 9%.

The big guys can also fall victim to the same shortsightedness. Digital Equipment Corp. fell 21/2 points to 861/2 on scuttlebutt that profits are not up to par. United Telecom, Inc. declined 2% points to 40% as analysts lowered earnings expectations for the

Amidst the earnings-related ambush, other companies hit new highs. Compaq Computer Corp. ballooned to 127%, up 8% points. Novell, Inc. also sat atop a new summit, up 5¼ points to 55. But wait, there's more. Share prices of Storage Technology Corp. were up % of a point last week to a new high of 33%.

Meanwhile, positive indicators in the semiconductor industry left Motorola, Inc. just shy of a new high, up 3 points to 86½, while Intel Corp. gained 1½ points to end at 48. In other news, Lotus Development Corp. gained 2½ points to finish at 38¼, after unveiling four Unix versions of its flagship spreadsheet. Oracle Systems Corp. and Borland International also picked up 21/2 points

each, to finish at 22% and 20%, respectively. Hardware gainers included IBM, up 2½ points to 120%; Sun Microsystems, Inc., up 3 points to 33%; and Apple Computer, Inc., up 11/2 points to 39%.

KIM S. NASH

Wooing converts proves tough

BY AMIEL KORNEL

While radical may be chic, the Next computer is no easy sell.

When Businessland, Inc. saleswoman Kathy Roepke demonstrated the Next workstation at Stratus Computer, Inc.'s Marlboro, Mass., headquarters last September, she was pleasantly surprised by enthusiastic reactions from employees.

"People, including a lot of end users, were there from 10 in the morning to four in the afternoon," recalled Roepke, who now manages the Stratus account for Businessland's Framingham, Mass., office. "Everyone was very excited."

Roepke was, too. She said she figured that the sale, one of Next's first volume deals in the commercial market, would be wrapped up before the end of the year.

However, marketing
Next, which incorporates unusual features
such as an optical disc,
stereo sound and an Adobe
Systems, Inc. Postscript display, turned out
to be different from selling more established
platforms. Although
Stratus eventually did
decide to buy the machine, nine months

elapsed before the deal was done. The minicomputer maker ultimately ordered 44 Next systems.

A look at the Stratus deal reveals some of the hurdles that Next and its distributors must cross to clinch more contracts:

• More than a personal computer. Next's use of the Mach operating system, a Unix derivative, and its strong emphasis on Ethernet connectivity make it more than just another commodity product. Selling Next turned out to be much more like selling a minicomputer or mainframe than hawking a PC, Roepke said. In the case of Stratus, that meant requirements of compatibility and interoperability with the buyer's host systems had to



Businessland's Roepke found the Next

be satisfie

• The unknown. Convincing a company to invest in new, untried technology is a challenge. "I never realized the amount of [organizational] levels that need to evaluate and sign off on a new platform," she said.

A new platform is viewed as "somewhat of a risk," Next Vice-President of Sales Todd Rulon-Miller said.

• Software, software, software. The availability of a quality application is key. Stratus had decided, after a two-year search, to adopt Frame Technologies' Framemaker software, one of the roughly 30 packages that can run on the Next. "Then, we looked for what to run it on," said Carol Dean, manager of

Stratus' technical publications department. After studying other workstation platforms, she made a recommendation to buy Next, she said, because "it felt extensible, easy to use, easy to learn, visually very clean and appealing."

Entrenched standards. Sites free of installed PCs are better sales candidates for Next. At Stratus, the technical publishing staff previously worked on terminals running in batch mode off of a Stratus.

tus minicomputer. For some potential customers, a purchase can be delayed or scuttled if users accustomed to working on DOS-based PCs or Apple Computer, Inc. Macintoshes resist switching to Next's Mach.

 Higher price. Cost comparisons with similar platforms make Next a tough sell. Company President Steve Jobs has reportedly laid out a firm policy of no price negotiating. Although their list prices may not differ much from that of Next, sharp discounting of PCs and Macs can make Next a less attractive buy.

"A Next machine is priced lower than a comparable Mac or PC fully loaded [with software]," Roepke said. "But then, the Mac or PC has the heck discounted out of it and it comes out cheaper than the Next."

Barely passing

nthusiasm in the higher education market, once considered key for Next, is on the wane.

"Winds on campus are blowing cool for Next use," said Tully Hammill, manager of library computer operations at the University of Washington in Seattle.

"Nobody is satisfied," he said. High on the list of complaints, he explained, is the slow appearance of applications software.

Next Vice-President of Sales Todd Rulon-Miller argued that the company is doing well in higher education, citing more than

300 contracts signed with universities for service and support.

The stakes are high. The desktop market for higher education may be worth as much as \$5 billion annually, according to Kenneth Green, senior research associate at the Center for Scholarly Research at the University of Southern California in Los Angeles.

Next has yet to make serious inroads into that market in terms of sales. Only about 100 of the 3,000 personal computers and workstations installed at Carnegie Mellon University, one of the company's founding investors, are from Next.

James Bruce, vice-provost for information systems at MIT, estimated that only 25 to 50 Next systems have been purchased through the school's microcomputer outlet. By contrast, students and faculty use about 12,000 IBM PC-compatibles and Apple Computer, Inc. Macintoshes on and off campus.

"People are asking, 'Do I want to invest a bundle of money in a machine that may not make it?" "Bruce said.

Revolution

FROM PAGE 1

"I'm not convinced Steve is still two years ahead," Bruce said.

For all of Jobs' braggadocio and tens of millions of investment dollars spent so far, the company continues to face formidable hurdles. A dearth of software applications and some disappointing technology have left potential buyers reluctant to commit to his new platform.

An exclusive distribution deal with computer retailer Business land, Inc. that was expected to generate sales of \$100 million by year's end has reportedly fallen far short. with Next insiders saving total unit sales, including direct sales to educational institutions, average only about 500 per month. These developments observers wondering whether Next will live up to its early expectations.

Next⁷s story provides wouldbe entrepreneurs with a textbook example of the difficulties of introducing a radical alternative to installed technologies.

"With Next, you're looking at the future," said Doug Edwards, marketing director at Informix

Corp., which shipped a Next version of its popular Wingz graphic spreadsheet in early May. "But sometimes the future is a difficult thing to understand, let alone embrace."

system a long sale

While no one is writing off the company, questions are being raised about why it has been slow to make its mark in the industry Jobs helped spawn. "It's safe to say they're off plan," said Floyd Kvamme, a partner at Palo Alto, Calif., venture capitalist

Kleiner Perkins Cauffield & Byers. Kvamme was previously executive vice-president at Ap-

From a financial point of view, Next can afford to take its time. Jobs and his financial backers — Japan's

Canon Ltd., billionaire H.
Ross Perot, Carnegie Mellon
University and Stanford University — have invested \$133 mililion in the venture. IBM has also
thrown its weight behind the
venture with a potentially lucrative licensing deal that has been
variously reported at between
\$10 million and \$50 million

That makes Next about five times the size of an average Silicon Valley start-up, Kvamme said. Canon's 1989 investment of \$100 million lifted the pro forma valuation of the company to \$600 million, facilitating any borrowing Next may choose to

Observers noted, however, that even overflowing corporate coffers do not last forever if they are not replenished. Spending at Next has been high, although specific figures for the privately held company are not available. The high costs of research and development, advertising, a highly automated factory in Fremont, Calif., rental of its Redwood City, Calif., headquarters and payroll for more than 350 employees mean Next is burning funds at a fast rate.

Planting roots

Is Jobs worried? Not yet. "What we're trying to do is grow a big old oak tree, and that takes time," he said in an interview. "If you look beneath any oak tree, you'll see a root system that's as big as the tree itself. And that's the stage we're in."

Although Jobs described annual sales as "healthy but not off the charts," International Data Corp. (IDC) in Framingham, Mass., estimated that fewer than 7,000 Next computers have been sold. Many of these have been spread among a range of product evaluators and software developers. In contrast,

IDC said Apple had shipped 445,000 Macs by January 1986, two years after its launch.

"They're clearly not where they want to be," said Dan Lavin of the Boston Computer Society's Next Users Group. "The question is, how far off are they?"

Next Vice-President of Sales Todd Rulon-Miller responded that it typically takes from 12 to 18 months of evaluation and testing before a new product hits its market stride. The Next machine only began that ramp-up cycle when the delayed operating system was introduced last October. Rulon-Miller said.

The slow pace of progress,

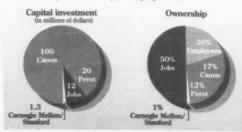
however, hurts Next's chances for success a little more each day, observers said. "Everyone agrees that if it had been able to come out a year earlier, it would have seemed more spectacular," said Richard Cyert, president of Carnegie Mellon.

Although the workstation was once a distinctly bold and elegant innovation, many of the same features and functions can now be had at a lower cost from other vendors.

For example, icon-based windowing environments such as the Open Software Foundation's Motif, IBM's Presentation Manager and Microsoft Corp.'s Windows are making Next less

It's good to be the king

Jobs' investment of \$12 million bought him 50% of Next, while Canon's \$100 million only landed it 17% of the company in 1988



Source: Next, Inc.

CW Chart: Paul Mock

Nextstep seduces developers

BY JAMES DALY

Steve Jobs positively glows when discussing Nextstep, the applications development environment that is turning heads among software authors. "Nextstep is ultimately our largest gem." the founder of Next said recently.

Although opinions of Next's hardware platform vary widely, the Nextstep package seems to garner widespread praise not only for its simplicity and strength but also for the doors it opens for developers.
The reason? While the Unix

operating system offers sophisticated features such as powerful networking capabilities and multitasking, it also employs a laborious and archaic command system that is difficult to master.

Nextstep hides the complexity of working with and developing for Unix behind an iconbased system of pull-down menus and windows. The most widely regarded feature of Nextstep is the Interface Builder, which makes it easier to write programs by using prepackaged computer code known as "ob-

"Users need an interface that mere mortals can understand to get Unix on the desktop," Jobs

The Unix market is an impor-

tant target for many to hit. Market research firm Dataquest. Inc. has predicted that by 1992, 26% of all desktop machines will be running some version of Unix.

Some analysts have also speculated that the popularity of Nextstep would one day propel Next into becoming a softwareonly company. Jobs, however, has clipped such theorizing. "Not likely," he said.

Software authors speak enthusiastically of the ease of developing programs with Nextstep. "It's a lot easier to prototype," said Alan Olsen. product development manager for Lotus Development Corp.'s Next spreadsheet project, which began in early 1989.

Turnabout

It may also be one of the great ironies of the computer industry that IBM, which Jobs once painted as the antithesis of everything he stood for back in his Apple days, has signed on to use Nextstep for its RISC System/6000 workstation.

Despite the significant vote of confidence, however, IBM's interest adds confusion to an already confused marketplace. Nextstep is not only out of step with IBM's proclaimed strategic emphasis on OS/2 but rests uneasily with its commitment to the Open Software Foundation's Motif interface.

Some analysts viewed IBM's endorsement of Nextstep as a hedge against its commitment to OSF/Motif and an admission that perhaps Nextstep's programming environment is superior. OSF/Motif sometimes seems like a product designed by committee, a committee over which IBM sometimes feels it has little

Although the Next interface and IBM's marketing department make a powerful combination, a key question is its ability to deliver meaningful applications in a timely manner.

Speaking in his typically confident manner, however, Jobs claimed that 150 software developers have made a major financial commitment to developing Nextstep applications ranked the priority of developing Next packages only behind DOS, OS/2 and the Macintosh.

On-deck hitters

ith hardware sales slow, Next hopes to lure customers to its platform with an array of upcoming enhancements: · A model based on Motorola, Inc.'s 68040 microprocessor will be available

by the end of the year. The current version uses the older 68030 chip. Today's users will be able to purchase an upgrade board for \$1,495.

The only possible hitch is that a federal judge in Texas recently ruled that the architecture of the 68030 infringes on certain Hitachi Ltd. patents, and Motorola may be forced to stop selling the chip because the 68040 uses several of the same design features as the 68030. · A system offering a color monitor has been promised for delivery before the snow flies. The new offering will provide photorealistic color and a graphics accelerator.

· Because some users have complained that the Next machine still runs far too slowly to manipulate sophisticated applications quickly, speculation has begun to circulate that the firm will introduce a model based on the reduced instruction set computing (RISC) architecture.

Analysts said a likely supplier could be IBM,

which has hinted that it may license out the superfast core of its RISC System/6000 line: the Performance Optimization With Enhanced RISC (POW-ER) chip. The 64-bit architecture provides I/O throughput of as much as 40M byte/sec. and is capable of processing up to five instructions per machine cycle.

IAMES DALY

Start-up stories

With less than 7,000 machines shipped in its first two years of business, Next is not setting any records

	Started shipping	Total number of U.S. shipments two years after announcement
Sun	Jan. 1982	1,700
Compaq	Jan. 1983	111,000
Apple Macintosh	Jan. 1984	445,000
Next	Oct. 1988	*6,775

*As of June 1990

distinguishable from the rest of the pack. In addition, the workstations of most vendors today are offered with some flavor of Unix as an option.

The machine's innovative features include stereo sound, optical disc storage, a built-in Ethernet port and an Adobe Systems, Inc. Postscript-based video monitor offering what-you-see-is-what-you-get display. Its advanced Mach operating system is a Unix version developed at Carnegie Mellon.

Yet information systems executives who have evaluated the machine have been lukewarm, forcing Next to backpedal on some of the features it once called its most revolutionary. The 256M-byte optical disc, for instance, was once envisioned as Next's strongest lure, able to provide up to 200 times the capacity of a floppy disk and more than 10 times the storage of most hard disks. With the disc, it was envisioned that developers could beef up their standard offerings with such capabilities as dictionaries and comprehensive

However, users have complained that the device's performance is too slow, and Canon's shipments of the much-ballyhooed discs have "slowed significantly," according to a Data-

quest, Inc. researcher at the firm's Storage Track '90 conference last month.

Last fall, acknowledging user complaints, Next was forced to offer a traditional magnetic hard disk as an option. Most of the units currently shipped reportedly include it.



Jobs: Next is 'trying to grow a big old oak tree, and that takes time

Many potential users also grumble about the absence of a floppy disk drive for copying programs and data. "It's strange to think about working without a floppy," said Perry Davis, senior vice-president of technology management at Saatchi & Saatchi Compton, Inc. in New York.

The machine's lack of a color monitor has also been cited. Jeff Katz, IS manager of the creative department at California advertising agency Foote, Cone and

Belding, said Next would have to offer a color monitor before he would consider investing in the machine. "None of the art directors here would be able to work in a black-and-white world." he said. The agency currently has 265 Macs installed.

Next officials have promised a color monitor

version by the end of the year. A lack of wide-

ranging software also hamhas pered sales and undermined Jobs' business plan. "When they get some better software, I'll give it a said Ed Klein, director of the information

center at Humana, Inc. in Louisville, Ky. Calling the machine "technol-

ogy in search of an application,' Davis said he does not see a application that 'burning couldn't be done some way on the Mac." The advertising agency has 140 Macs divided between its New York and California offices, as well as 850 IBM Personal Computers.

We need to supply incredibly great applications, and then the whole situation will take care of

itself." Jobs said.

This is expected to happen during the next few months, as more and more business software developers host comingout parties for Next-oriented ap-Businessland plications, spokesman said. "We're looking at lots of spreadsheet packages as well as word processing and database applicafront-end tions," said Kevin Compton, director of advanced systems at the San Jose, Calif.-based firm.

A 40-member team at Lotus Development Corp. has been working full-time for more than a year developing a new spreadsheet for the Next machine. Although the Cambridge, Mass., company refused to say when its so-called Back Bay product will be available, Jobs indicated it would be out by the fall. He added that there will be at least one other spreadsheet coming out this year, in addition to the Wingz and Lotus packages.

The promotional capital earned from being part of Jobs' latest venture is reason enough for some software companies to commit to the machine. "It's a high-visibility platform," Edwards noted.

Some developers have found it easy to port their software to the Next computer. Stephan Adams, president of Oakland, Cal-

if.-based Adamation, developer of an office automation system for managing and tracking client communications, said, "Our experience was fantastic."

Not all developers have found the port so simple, however.

There is more flexibility in developing for [OSF's] Motif," Edwards said. Next is "being very religious about their interface. . . . It's an obstacle if you want to bring Mac applications over and make them work in the same way," he said.

A half-dozen engineers at Informix worked for more than a year to port Wingz to the Next platform.

'The port wasn't automatic.' said Malcolm Hobbs, director of product marketing at 5-year-old Frame Technologies Corp. in San Jose, Calif. He said it took two engineers six months to port the company's Unix-based desktop publishing software to Next.

Neither Jobs' reputation nor his backers' deep pockets can carry the company indefinitely, observers warned. As developers continue their struggle to offer software applications, the novelty of Next seems to be wearing off. In the fickle and fast-moving world of computer start-ups, Steve Jobs' latest revolution has yet to earn a place in history.

NEWS SHORTS

Honeywell nabs Chrysler executive

Chrysler Corp.'s executive director of MIS, G. Nichols "Nick" Simonds, left the auto giant earlier this month to become Honeywell, Inc.'s new vice-president of corporate information management. Simonds replaced Irma M. Wyman, who retired in April. Simonds joined Chrysler as information systems chief in 1984 after 20 years in IS with Inland Steel Co. and the former National Steel Co. Chrysler named Harry A. Lewis, operations group controller and a 25-year company veteran, to replace Simonds.

Sun edges IBM

Sun Microsystems, Inc. produces the favorite workstation among Fortune 500 IS executives, according to a survey by The Sierra Group/First Boston MIS Executive Council. IBM's RISC System/6000 appears to have scored early points with users and came in second in the survey; Hewlett-Packard Co.'s Apollo division and Digital Equipment Corp. came in third and fourth, respectively. The survey ranked 13 issues that large companies consider when purchasing workstations, including compatibility, power, graphics capabilities and price.

Software groups unite

The Business Software Alliance, a group of six software companies taking legal action against software pirates in Europe and the Pacific Rim, has decided to merge with the larger Software Publishers Association (SPA), the Washington, D.C.-based groups announced last week. The Business Software Alliance will retain its name and become an arm of SPA responsible for international copyright and trade issues.

Memorex plans optical archive

An optical storage-based archiving system is under development at Memorex Telex Corp. Slated for delivery in the fourth quarter, the company's first optical system will include on-line report management and microfiche replacement functions and will involve transparent mainframe-attached optical disc drives and robotic media handling designed to place as much as 340 billion characters of storage in 15.8 sq ft. The system is currently being tested at several locations internationally.

Datapoint adopts Oracle

Datapoint Corp. last week announced that Oracle Systems Corp.'s Oracle 6 relational database software is now available to run on the hardware vendor's 7000 series of Intel Corp. 80386- and I486-based single and multiprocessor network servers. Using Oracle's SQLnet/Netbios protocol, Datapoint 7000 series servers can function as the database engine for any user on the network whose application employs this interface. According to Datapoint, a 7850 model server can support as many as 64 concurrent Oracle users on a network.

AT&T offers LAN products

AT&T announced a slew of local-area network interconnectivity products last week, including its first Fiber Distributed Data Interface (FDDI) offerings. An FDDI backbone interconnects 802.3 Ethernet LANs and an FDDI router is said to interconnect up to two FDDI Dual Access Station networks and up to 28 Ethernet LANs over a wide-area network. An FDDI concentrator is said to link any FDDI device, including bridges, routers and workstations, to an FDDI ring. AT&T also upgraded its Datakit II Virtual Circuit Switch.

Clip-art controversy roils

Computer Support Corp., a graphics software developer affiliated with Control Data Corp., sued Software Publishing Corp., alleging that hundreds of clip-art images contained in Computer Support products were copied without permission in three of Software Publishing's popular Harvard Graphics programs. The action is a counterclaim against a Software Publishing suit that claims Computer Support's software and clip art are not protected by U.S. copyright laws.

GAO: Uncle Sam hasn't been minding the books

BY GARY H. ANTHES

WASHINGTON, D.C. — Accounting system flaws and management lapses have contributed to hundreds of millions of dollars' worth of discrepancies in the books that account for public debt and related interest, the U.S. General Accounting Office (GAO) has found.

According to congressional auditors, the U.S. Treasury Department is unable to verify that reported interest payments equal actual payments. As of December 1988, 18 account balances totaling more than \$53 billion had not been reconciled or verified since the early 1980s, the GAO said.

The GAO said it had neither sought nor found evidence of fraud or abuse but had found an account, out of balance by \$163 million, that appeared vulnerable to fraud. However, the report did identify almost \$1 billion in

Officials at the Treasury's Bureau of the Public Debt generally agreed with the auditors' conclusions but said substantial progress had been made in recent months in reconciling accounts. Richard Gregg, commissioner of the Public Debt, said the bureau's own extensive efforts to clean up discrepancies had turned up no evidence of payment errors or incorrect issues of securities. No improprieties were found, he said.

Gregg said the bureau had reconciled 16 of 18 accounts. However, the two remaining accounts total about \$37 billion. He said the remaining imbalances involve transactions going back a number of years, while current accounts have balanced for the past two years.

One of the accounts not vet



reconciled tracks over-thecounter deposits and disbursements in the Securities Transactions Branch. The GAO cited earlier reviews by the Treasury Department that found that "the branch's internal controls were so lax that unauthorized employees had access to blank Treasury checks and the checkwriter."

Calling the weaknesses "serious, widespread and long-standing," the GAO cited the Treasury's failure to perform timely account reconciliations, lack of controls for detecting and correcting errors, lack of systems integration, poor accounting

system documentation and lack of training for accountants.

Gregg said account imbalances often occur because of timing differences caused by the bureau's patchwork of antiquated manual and automated subsystems. The situation will be much improved when the bureau installs a new integrated accounting and reporting system next year, he said. Gregg also said that the underlying systems that actually control payments and securities have better controls than the accounting system.

The new Public Debt Accounting and Reporting System, begun in 1986, is being developed by the Federal Reserve Bank of Cleveland. It will be installed on an IBM 3081 mainframe and will have electronic links to each of the 36 Federal Reserve banks and branches. The banks and branches, which handle much of the day-to-day activity in Treasury securities, will send transaction records to the Bureau of the Public Debt in daily batches or on-line, said Van Zeck, deputy commissioner of the Public Debt.

The new system will offer two key advantages over the existing collection of loosely coupled subsystems, Zeck said. All data will be sent in electronic form, eliminating the errorprone data keying from paper transactions. The system will also employ double-entry accounting, eliminating the need to reconcile the single-entry subsystems.

The GAO said the new system will help, but management will also have to strengthen its oversight of operations.

Unisys backs Presentation Manager

BY ELLIS BOOKER

BLUE BELL, Pa. — Seeking to enlarge its presence in the network computing market, Unisys Corp. today plans to publish a common user interface for CTOS, its multiuser computer system.

Company officials said last week that Unisys has licensed and will support Microsoft Corp.'s Presentation Manager — becoming the first non-OS/2 operating system to do so — as well as Microsoft compilers. On the Unix front, Unisys said CTOS/Open will be the first non-Unix operating system to support the government's Posix specification. These tools will be the core of the next generation of CTOS' software development environment, Unisys said.

At a conference for CTOS users and international developers being held in Paris today, Unisys plans to publish application programming interfaces based on Presentation Manager for both graphical and character-based CTOS workstations.

The move will complete the effort, begun at last year's Paris conference, to standardize the CTOS systems sold by Unisys, France's Groupe Bull and eight other vendors [CW, June 19, 1989]. According to Unisys, there are 740,000 of the modular CTOS systems, which are based on Intel Corp. 80286 and 80386 microprocessors, installed worldwide.

Unisys' commitment to a graphical user interface was praised by CTOS user Dan Lienau, director of data processing at the Wisconsin Department of Employment Relations in Madison. "I'm glad they're moving that way," said Lienau, adding that applications for his network of 55 diskless CTOS workstations "lack some of the features and user-friendliness available for PC LANs."

CTOS is a dual operating and multiuser networking system that Unisys has owned since 1988, when it acquired Convergent Technologies, Inc., a CTOS developer and OEM. While arguing that CTOS/ Open is both less expensive and more powerful than the two dominant alternatives for multiuser computing — minicomputer-based architectures and personal computer local-area networks — Unisys officials and analysts acknowledged that CTOS has been somewhat of a sleeper in the marketplace.

"Nobody calls up Unisys asking for a CTOS solution," said Drew Hoffman, vice-president and general manager of Unisys' Network Computing Group-Distributed Systems Division.

However, John Logan, vicepresident of The Aberdeen Group, a market research and consulting firm in Boston, said he believes that CTOS, with its message-based operating system, offers the distributed computing now that IBM still promises with its Officevision.

Logan said the configuration requirements for CTOS computing are far less than IBM's Systems Application Architecture and OS/2 Extended Edition combination.

Olsen

sluggish U.S. market and slowing European computer sales meant "external forecasts of this quarter's earnings would appear to be too optimistic."

"I think Wall Street, in the last week or so, is catching on that this is going to be a bad quarter," said Robert Herwick, an analyst at Hambrecht & Quist. Inc. in San Francisco.

force his company into massive layoffs or slow the pace of research and development. He said there is no corporatewide goal for employee cutbacks, even though DEC has managed to convince only about 2,000 employees out of more than 125,000 to take advantage of generous severance plan offers.

Olsen argued that chopping down the payroll can damage a company's customer service once it begins to grow again. We make no claims this quarter

and a line of applications servers, according to several analysts.
The VAX 4000 is the successor to the Microvax 3800 and 3900. Equipped with a more advanced chip from the 6000 line, it will deliver twice the performance, expandability, memory and storage capacity.

In his discussion of the changes under way at DEC. Olsen acknowledged that Jack Smith, senior vice-president of operations, is assuming more of operations, is assuming more of the day-to-day responsibilities of running the company. "I dump everything I can think of dump-ing on him," Olsen said.

'I think we're carefully making believe there's not a spotlight on him," the DEC founder and president explained. "It's unhealthy, you see, to be crown prince when the king isn't about to give up."

Olsen also hinted at coming changes in the company's approach to the retail computer market, which DEC has assiduously avoided since its disastrous attempt with the Rainhow and Professional personal computers in the early 1980s. The company is now working on its own Intel Corp. 80386- and I486-based desktop machines and will likely go through retail channels to target small business customers.

For its customers in the Unix world, Olsen said DEC would eventually "phase together" its own Ultrix operating system with the OSF's OSF/1 operating system. Analysts that to mean that DEC would essentially replace the underpinnings of its own Univ version



en Olsen, DEC's only president in its 33-year history, is known to be colorful and candid. In an interview with Computerworld last week, Olsen spiced his comments with views of DEC and the industry. · On the confusion caused by DEC's stream of product announcements: "There are a lot of products coming out, and that does cause confusion. But we have a choice of getting behind or making too many products."

• On whether problems within the sales force drove away former Senior Vice-President Jack Shields after 28 years at DEC: "I don't know. I never asked him. It just didn't seem polite. He didn't say that was why. He didn't say at all."

• On efforts to reduce the employee head count: "I'm not saying that's not going on. I'm not conscious of it because it's not at the level where it's my kind of problem.

• On whether DEC has plans to resell Apple Computer, Inc. Macintoshes: "I asked that question and so far haven't gotten any good answers back. If anything, I say we should have done it years ago.

• On the continuing doldrums for DEC stock: "Wall Street is interested in profit today, and we're not making the profit today we should.

• On paying a dividend to shareholders: "We've been making cash for quite a while now. It's probably the right assumption that we should pay dividends. The problem is, our advisers say 'Not now.' '

GLENN RIPKIN



DEC's Kenneth H. Olsen says firm's future is bright

The VAX 9000 shipping delay is being caused by manufacturing glitches, delays with parts suppliers and the complexity of the operating system, Olsen said. He declined to predict any show of profit from mainframe sales in 1991.

Olsen did say that "end-ofthe-season doldrums" would not is going to show all the positive things that people are looking for," he said, "but our investments are to grow, not to cut

The next round of new hardware products is expected during the second week in July at Decworld in Boston, with the announcement of the VAX 4000 with the OSF standard

"Ultrix will still be DEC's implementation of Unix, but OSF/1 will be the base level operating environment," said Dale Kutnick, an analyst at Meta Group. Inc. in Westport, Conn. "What most vendors will do is add their own value on top of this basic Unix system that has been standardized !

While Olsen said he no longer

believes in committing to "a VMS-class Ultrix," he confirmed that the company is spending as much or more on Ultrix development as on VMS. The spectrum of scientific and technical DEC users who demand Unix is "a large part of our market and very important to us," Olsen said.

Features Editor Glenn Rifhis contributed to this report

DEC upgrades, renames line of CASE tools

BY MAURA J. HARRINGTON

Digital Equipment Corp. coined an umbrella name for its computer-aided software engineering (CASE) strategy — Cohesion and announced enhancements to its current products and services

Cohesion supports the development, deployment and management of DEC's CASE strategy, which is built on its Network Applications Support platform, according to Marion Dancy, DEC's application development systems group manager.

A key component of Coheaccording to Dancy, is CDD/Repository, DEC's distributed repository based on an obiect-oriented interface.

The latest version CDD/Repository, introduced last week and slated for availability by the first half of 1991, was designed to run on both DEC VMS and Ultrix platforms,

CDD/Repository reportedly allows the user to run both technical and commercial applications and organize them in an object-oriented manner.

The new version allows a user

to change part of a program without disrupting the whole, said Alfonso Dilanni, DEC's engineering CASE program manager

DEC also unveiled CDD/Administrator, VAX Rally Version 2.2 and Vaxset Version 10.

CDD/Administrator is a Decwindows/Motif-based tool that gives users access to CDD/Repository, Dancy said.

Vaxset Version 10 includes five new CASE components. which provide capturing, viewing and reporting capabilities for VAX 6000/9000 for vector pro-

Ingres/DEC deal tabled

BY JEAN S. BOZMAN

ALAMEDA, Calif. - It would have meant millions of dollars in cash for Ingres Corp., but Digital Equipment Corp. last week refused to take a proposed minority position in the relational database company.

Ingres said it announced the break in negotiations because the Securities and Exchange Commission considered it a "material" event that could have affected Ingres stock prices.

Negotiations between the two firms broke off after a month of meetings, Ingres Vice-President of Marketing Chris Greendale said. "We were looking to establish a closer relationship with DEC and to gain an additional source of cash," Greendale explained. "But the talks broke off around the issue of supporting open systems. We really have a problem with any relationship that wouldn't allow us to

DEC would not comment on the details of the negotiations, which were initiated by Ingres. "We mutually agreed not to build

a technical partnership with them," said DEC spokesman Jeffry Gibson. "We will continue our other activities with them, which include licensing agreements." Ingres wrote the Ultrix/SQL relational database management system that is packaged with some DEC Unix workstations, and the Ingres DBMS is sold as an option for DEC VAX computers.

DEC may have been wary of making a commitment to Ingres at a time when it has made pacts with Ingres competitors. "DEC just recently made announcements about marketing agreements with Oracle and Sybase, said Rob Anderson, a software consultant at Stratagem, Inc. in San Francisco. "A lot of things probably got thrown into DEC's decision — and the degree of dis-comfort it would cause other vendors was probably part of it.'

Greendale indicated that the search for more cash for \$130 million Ingres would probably continue. "We're in a cash-burn business. Anytime you're growing at 30% or more, you burn cash," Greendale said. "So

we're still looking.

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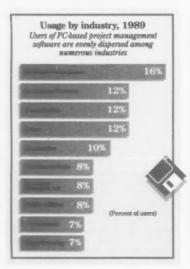


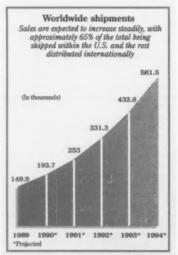
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TRENDS



Though they may lack a lot of the power and features of the mainframe versions, they're quite flexible; for nonprogrammer types, a PC-based project management package is one way to get up and running fast





Top six packages installed worldwide

Some of the packages with the largest installed bases are also among the least expensive on the market; prices of PC-based project management software range from \$270 to \$5,000

Vendor	Product	1989 installed base	List price	
Symantec	Timeline	150,000	\$595	
Applied Business Technology	Project Workbench	60.000	\$1,275	
Software Publishing	Harvard Project	50,000	8095	
Marresuft	Microsoft Project	50,000	\$495	
Computer Associates	Superproject Expert	40,000	\$690	*
Micro Planning	Instaplan	30,000	\$270	

Source: International Data Corp., Framingham, Mass

CW Chart: Tom Monahar

NEXT WEEK

C arol J. Anderson
has systems on the
move at Trailer Train Co.
after just six months as
vice-president of MIS. An
18-year information systems veteran at the Chicago company, Anderson believes in results through
teamwork — whether on
the job or racing sailboats
on the weekend. Find out
more about her in Manager's Journal.



The first in a series of performance benchmarks for the integration of CASE and fourth-generation language products begins in Systems & Software. The benchmarks, done by Computer Futures Ltd., show the capability of the major CASE/4GL systems under live fire conditions while illustrating form, style and level of integration.

INSIDE LINES

Executive line

Cognos stock is up approximately 200% from about \$3 per share late last year, and company sources say that its soon-to-be-issued second-quarter report will be on the upbeat side as well. It could be purely by accident that the recently struggling software maker's uptick coincides with the advent of former Cullinet Software marketing Vice-President Jeffrey Papows to Cognos' top marketing spot last fall — then again, maybe not. According to sources close to the company, Papows will be named president this week.

We should be surprised?

Apple may soon have to look outside its gates to find a successor to Allan Loren, who abruptly left his post as head of Apple USA in January. Apple execs are finding it a tough slot to fill: Four people have passed through the job in the past five years and met with frustration at Apple's continually shifting focus about what it wants to do in the domestic market. Sources say several top-level insiders, including Bill Coldrick, senior vice-president for U.S. sales, have so far nixed offers for the job.

Too hot to handle

A still-unreleased Environmental Protection Agency report recommended that extremely low-frequency electromagnetic fields, such as those sometimes related to VDTs, be classified as a "probable" cause of human cancer. That recommendation was rescinded pending further review, according to Louis Slesin, editor of *Microwave News*. In a summary of the report, the EPA said that the health relationship was stronger in high-exposure jobs, such as power-line workers, but that lower-dose effects could not be ruled out.

Somebody's idea of a peace dividend

The Department of Defense is looking for a company to research the potential of "using computer viruses as an electronic countermeasure technique against generic military communications systems/nets." The DOD also wants to find out if computer viruses could be injected into enemy computers by radio transmission.

Top-secret defection

Users rated Computer Associates' ACF2 as the best mainframe security program in last week's Computerworld Buyers' Scorecard, but the co-author of the product has bolted from CA to start his own company. Eberhard Klemens, a vicepresident of research and development at CA, has founded the Eberhard Klemens Co. in Naperville, Ill. Klemens cofounded original ACF2 vendor SKK, Inc., which was acquired by Uccel, which was then acquired by CA.

The Blue LAN plan

Separate from PC Expo, look for IBM to make several LANrelated announcements this week. A source revealed the following tidbits: A new version of TCP/IP that supports Netview, full Ethernet support for all its products and enhanced LAN support for the Risc System/6000. IBM will also announce support for the Kerberos access security mechanism.

The French connection

3Com continues to push itself overseas. Like other makers of ancillary computer devices, the Santa Clara, Calif.-based networking company is already planning Soviet inroads. One company executive said 3Com may piggyback Groupe Bull to enter the new market. Bull, the executive pointed out, has the experience and poise to move in, and it could help decipher the connectivity problems that will exist.

We've heard of going for the jugular, but this is a bit overboard: We've been told that at a recent Oracle regional sales meeting in Boston, the sales manager had a fountain pen filled with real blood with which salespeople were supposed to sign a contract to commit 100% to selling Oracle software. Oracle would neither confirm nor deny that report. A better way to motivate the sales force is to tell 'em what they're doing wrong, and that's what we're here for. Contact Assistant News Editor Jim Connolly at 800-343-6474 or fax your best information to 508-875-8931.



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